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ECONOMIC AFFAIRS

EKO: ECONOMICS AND ORGANIZATION
OF INDUSTRIAL PRODUCTION

No. 3, March 1984

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USSR REPORT
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No. 3, March 1984

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INTEGRATED PLANNING URGED FOR NEW AGROINDUSTRIAL CENTERS

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 3-11

[Article by V. R. Boyev, corresponding member of the All-Union Academy of Agricultural Sciences imeni Lenin and director of the Siberian Scientific Research Institute for Agricultural Economics, and V. F. Bashkatov, Candidate of Economic Sciences and Senior Science Associate from Novosibirsk: "Agroindustrial Centers: An Imperative of the Times"]

[Text] [Editorial Introduction] A key condition for carrying out the Food Program is accelerated scientific and technical progress, the highly efficient use of production potential and the strengthening of the physical plant of agriculture. Siberian scientists describe below the "synthesis" of industrial and agrarian production as one of the ways for carrying out the Food Program. Agroindustrial centers [APU] are the natural development of the concept of territorial-production complexes, where industry and agriculture jointly benefit from the effect of production consolidation. Qualitatively new conditions are being established for improving and developing food products and for moving the products to the consumer. With all the uniqueness of the circumstances which have given rise to the theory and practice of the APU, the experience of their organization, it seems to us, is of importance not only for Siberia and the Far East.

The development of the productive forces in Siberia and the Far East places ever-higher demands on their production base. The level and structure of the production of food products, the placement and organization of agriculture are influenced by the shortage of labor resources, the focal placement of industrial enterprises and the extreme natural conditions. The gigantic region is characterized by a limited amount of land suitable for agricultural use, the poor fertility of the land, the short growing season and abrupt temperature drops. The increased need for large complexes of equipment, the underdevelopment of the systems for serving production, for storing and selling the products complicate the task of supplying the population with balanced food products.

As experience shows, the orientation to shipping in food from regions with developed agriculture is far from always effective. At times, delivery is completely impossible due to the absence of dependable transport links, the expensiveness of the shipments, the great losses and the deterioration in product quality with transporting.

In recent years on the basis of power production, the utilities of cities and industrial enterprises and other opportunities for conglomeration in the regions of Siberia and the Far East, agroindustrial centers (APU) are being established. These represent groups of large agricultural enterprises of the industrial types specialized in the production of vegetables, milk, pork, eggs, broilers and other products for the rapidly growing cities and industrial centers. Such enterprises are usually located on a small territory and this contributes to the pooled use of the subsidiary and servicing types of production, utilities, communications, financial, labor and material resources (see Table 1).

Table 1

Composition of Agroindustrial Centers

Nekrasovskiy	Melnikovskiy
Poultry farm (550,000 layers)	Poultry farm (10.5 million layers)
Hog complex (54,000 head)	Breeding farm for poultry meat breeds (100,000 head)
Breeding farm (440,000 breeding sows)	Breeding farm for poultry egg breeds (200,000 head)
Installation for fattening cattle [feed lot] (10,000 head)	Hothouse combine (24 hectares)
Broiler poultry farm (10.5 million head)	Goose farm (125,000 head)
Residential settlement	Turkey farm (125,000 head)
	Residential settlement (10,000 persons)
Usolye	Tomsk
Poultry farm (920,000 layers)	Poultry farm (6 million head)
Hog farm (108,000 head)	Hog farm (108,000 head)
Hog breeding farm	Breeding farm (440,000 breeding sows)
Hothouse combine	Hothouse combine (38 hectares)
Duck farm (4.5 million head)	Broiler poultry farm (6 million head)
Residential settlement (10,000 persons)	Residential settlement (6,000 persons)

As a territorial form for organizing the production of food products, the APU is a portion of the oblast's production complex. Practice has posed the following basic forms of the APU:

- 1) Location with reliance on energy from industrial enterprises and with partial cooperation in production infrastructure (Usolye and Melnikovskiy APU in Irkutsk Oblast, Nekrasovskiy in Khabarovsk Kray);

2) Placement on the basis of energy from industrial centers with partial pooling of utilities (Bratsk APU in Irkutsk Oblast);

3) Group placement using own production resources (Kochenevskiy and Kuybyshev APU in Novosibirsk Oblast).

The APU often include subsidiary farms of industrial and other departments which, as a rule, utilize the production resources of the industrial enterprises.

The group placement of the agricultural enterprises with the pooling of subsidiary and auxiliary types of production and the cultural-service infrastructure substantially reduces the capital and operating expenditures, as well as the length of expensive utility lines. The number of employees is reduced, while the territories adjacent to the towns and industrial centers are more rationally utilized.

The concentrating of construction and installation work on a relatively small territory accelerates construction and this is important for rapidly increasing the production of food products. Thus, the establishing of the Nekrasovskiy group of agricultural enterprises close to Khabarovsk provided 8 million rubles of savings in capital expenditures and 3.1 million rubles in operating outlays. The organizing of the Usolye APU in Irkutsk Oblast has made it possible to reduce capital expenditures by 4.7 million rubles and operating ones by 0.9 million rubles, while the construction times of the poultry farm, the dairy complexes and the hothouse combine have been shortened by 2/3 to 1/2 the time in comparison with the ordinary.

The group placement of the agricultural enterprises had made it possible to more effectively deliver the products to the consumer and has contributed to the social development of the countryside. As a rule, the APU form a social infrastructure which is close to the urban level. This helps to retain the skilled personnel, to make rational use of the labor of second members of the families as well as widely employ industrial technology in agricultural production.

In Western Siberia, there are real conditions for setting up an extensive network of APU. On the basis of the Tobolsk Petrochemical Complex it is possible, for example, to have the following APU: a hothouse combine on 12 hectares, a hog farm with 54,000 head, a poultry farm with 400,000 layers, a broiler farm of 3-5 million birds and a meat combine for 30 tons per shift. Here it makes sense to combine the APU and the petroleum complex for water supply, road and other communications and utilities. It would be advisable to use a common boiler installation, sewage treatment, repair-machine and repair-construction shops, motor pools, firehouse, veterinary and other services. The pooling of auxiliary, subsidiary and servicing production, utilities and installations will save approximately 20 million rubles of capital investments and will reduce their operation by 3.5-4 million rubles a year. The number of workers will decline by 370-400 persons.

The experience of setting up and operating the APU shows the advisability of the joint designing of industrial and agricultural production. Such an approach conforms more completely to the interests of the region's integrated development,

its energy potential and production infrastructure with the coordinating of agricultural production and a system for marketing the food products to these. This prevents the subsequent expansion of the TETs, the utilities and other services, involving the loss of time and additional expenditures.

However, the development rate of the APU network and the effectiveness of their operation are restricted by the absence of a long-range development plan and in the designing stage by the incompleteness of a general plan. For example, in the course of establishing the Usolye-Sibirskoye APU in Irkutsk Oblast, the production specialization and the capacity of the enterprises were changed and this led ultimately to a 26 percent increase in construction costs. A significant overexpenditure was permitted due to the breaking up of designing and construction of the APU near Tomsk. As practice shows, cooperation is not always properly organized for the subsidiary, auxiliary and servicing production of the APU and this reduces the effect from the group placement of the enterprises (see Table 2). One of the main factors is the difficulty of interdepartmental agreements in the course of the joint designing, construction and operation of industrial and agricultural projects. Thus, the construction of the enterprises at the Tomsk APU started in 1976. A general agrotown called Svetlyy with 10,000-12,000 inhabitants was built with all conveniences and good transport communications were organized. A common power supply, sewage treatment and other projects were built and a portion of these was based on the resources of the Tomsk Chemical Complex being built nearby.

Table 2

Cooperation of Enterprises in Agroindustrial Centers

	Nekrasovskiy	Melnikovskiy	Usolye	Ziminskiy	Tomsk
Heat supply	C _p	C _p	C _p	C _p	O
Water supply	C	C _p	C _p	C _p	C _p
Electric supply	C	C	C	C	O
Roads	O	O	O	O	O
Transport	O	O	O	O	O
Repair of production equipment	O	O	O	O	O
Repair-construction service	O	O	O	O	O
Sewage treatment	C	C	C _p	C	C _p
Designing	C	C	C	C	O
Construction	C	C _p	C _p	C	O
Housing	C	C	C	C	C _p
Administration	O	O	O	O	O

O--Own

C--Completely pooled

C_p--Partially pooled

Although the construction of the group of territorially unified enterprises was carried out almost simultaneously initially a unified production and social infrastructure was not proposed. In the stage of designing the TPK [Territorial-Production Complex], the residential settlement was based on the village of Kuzovlevo and for the poultry farm the village of Rozhenka. The idea of a common residential settlement arose when the hog farm was being erected. The connecting link here was the decision to build joint sewage works with the subsequent moving of them to the municipal ones.

The establishing of the APK was complicated by the difference in the design times. In the designing they assumed the joint use of the treatment works of the chemical plant; the construction of a single collector was assumed. As for heat supply, cooperation was not planned here. Moreover, with the expansion of the broiler farm, the construction of their own broiler house would be started. The development of the hog farm required the reconstruction of the existing boiler. Cooperation in the subsidiary, auxiliary and servicing production also was not considered.

The territorial proximity of the enterprises makes it wise to pool equipment in common garages and shops for repairing and servicing tractors, motor vehicles and other machines and mechanisms. Even now the total deductions on major overhauls and routine repair of buildings and structures is 3.5 million rubles. Here one can see the prerequisites for setting up a common, highly mechanized construction and repair organization.

Another vital problem for the APU is to supply the livestock farms with feed. Since the APU, as a rule, are located close to large cities and industrial centers, there are difficulties in allocating plots of land for fodder production. In forming the APU, particularly if industrial development is carried out under extreme conditions, provision must be made for the establishing of so-called rear bases for producing transportable feed (grain feed, hay, granules, vitamin-grass meal and so forth) in regions with better soil and climatic conditions. For example, for the APU close to Komsomolsk-na-Amure, the feed supply could be organized on free lands in the Jewish Autonomous Oblast.

Even in the stage of designing the APU, thought must be given to measures to preserve the ecological equilibrium in the area of their establishing. Organic production wastes are basically used as fertilizer and in small amounts can be processed into livestock feed. The liquid fractions after primary settling or treatment are released into the treatment works for further utilization. The diluted effluents (after their primary purification and decontamination) from the hog farm with 108,000 head can be used to irrigate an area of land of around 3,000 hectares.

The Siberian climatic conditions (the brief summer with the late thaw and early frost) make it essential to have storage tanks for manure and effluents for an 8-month supply. These increase the cost of construction and reduce the effectiveness of capital expenditures. For this reason, there must be a thorough scientific elaboration for the recovery of livestock waste products under extreme conditions. Prior to a radical solution to the problem, the only alternative remains the release of the wastes into treatment works. Over the long run, the APU are conceived of as ecologically closed systems.

Regardless of the high economic effectiveness of the APU, particularly in areas of new economic development, as yet proper attention is not being paid to their organization. Thus, in the general plan and technical and economic feasibility studies for the towns of Kogalymskiy (the designer, Lengiprogor [Leningrad State Institute for the Designing of Cities]) and Noyabrskiy (designer, Mosgi-progor [Moscow State Design Institute for Cities]) in Tyumen Oblast, additional capacity has not been incorporated for water, heat, electric power and so forth for the agricultural production at the APU. Sooner or later the necessity of establishing a production base will arise and involve the reconstruction and expansion of capacity at the TETs, water intakes and so forth and this will require major outlays.

The need for integrated planning, designing and construction has long been present. However, a decision has still not been taken obliging the design organizations to provide resources for the development of agricultural production and for creating a food supply for the new development areas.

The question would be aided by consolidated, differentiated norms for proportional capital investments. These would consider expenditures on construction and expansion not only for the industrial enterprises themselves but also for the development of their food supply. It would be advisable to carry out the construction of the APU under the title lists of the involved ministries with the subsequent turning over of capacity for operation to the agricultural organizations.

The establishing of the pioneer APU has shown their viability and high economic effectiveness. Experience has made it possible to recommend the APU as a promising form of organizing agricultural production, particularly in areas of new economic development.

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INCORPORATION OF FARM UNITS IN INDUSTRIAL CENTERS URGED

Novosibirsk *EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO)* in Russian No 3, Mar 83 pp 11-19

[Article by V. G. Korochkin, director of the Institute for the Designing of Agricultural Construction in Eastern Siberia under the RSFSR Gosstroy, Irkutsk: "Agriculture in an Industrial Center"]

[Text] The experience of organizing concentrated agricultural production can be found in Irkutsk and Kemerovo Oblasts, in Khabarovsk Kray and certain other regions. We have in mind the more than 10 years' experience in the group construction and operation of agricultural enterprises on an industrial basis. Extensive material has been acquired which needs generalization and analysis.

"A group in an industrial center" is viewed as several large agricultural production lines on an industrial basis brought together by a common system of utilities, housing and other forms of cooperation and connected to the power supply of the industrial center. The pooling of utilities is economically advantageous and allows an increase in their length in the interests of the territorial isolating of the group.

Relying on the energy of an industrial center frees the agricultural group from the upkeep and servicing of autonomous sources of heat, water and so forth and makes it possible to concentrate on producing the basic product. Economically this is advantageous since heat, water and waste treatment are ordinarily cheaper than from autonomous sources.

This is the essence of the idea of incorporating an agricultural group in the "city--industrial site" system. As experience has been acquired in operation it has become clear that the effect of placement is not limited to the benefits of using the energy capacity of the industrial center.

The question is that the autonomously located and energy-dependent hog farms, hothouse complexes and poultry farms with their own housing and sociocultural facilities experience typical difficulties due to the unreliability of the heat sources, water supply and sewage systems. In addition, there is the problem of the underdevelopment of the repair service, the vulnerability of the equipment to emergencies, the low level of zootechnical and agronomic work, an inefficient production level, delayed technical progress, the overloading of specialists and losses of raw materials and products.

Modern agricultural technology, particularly the industrially based, requires professional specialists as engineers, technicians and so forth. However, the staff schedule of an agricultural enterprise in and of itself does not provide for the required range of specialties and the number of positions is limited. This limits the number of specialists who possibly are not envisaged by the job instructions but are vitally essential for production. It is a different matter for the agricultural group and industrial center as a whole, where a large number of specialists is concentrated. Clearly a technical or economic decision will be found more quickly here since the range of persons involved in the search is much broader, it is simpler to organize a temporary special-problem group for surmounting a problem, there will be fewer mistakes out of ignorance, there will be more proposals for improving production methods and a greater reserve for tilling in. In an industrial center there is, finally, the possibility of obtaining technical and scientific help outside the enterprise, that is, from adjacent neighbors, to manufacture the essential part there and so forth.

Thus, a cumulative effect arises out of the collective knowledge and experience. Such an effect, a sort of cultural-technical potential of the collective, grows progressively with its size. If every two production workers would master at least two specialties, then working together they would represent four professions.

The weakness of the cultural and technical potential which besets the autonomous, isolated agricultural enterprises on an industrial base can be overcome by locating them near industrial centers. This is the development of the idea of incorporating the agricultural group into the "city--industrial site" system.

The idea has been confirmed by practice and in Irkutsk Oblast the Usolye-Siberskoye and Melnikovskiy groups have been established, the Nekrasovskiy in Khabarovsk Kray and there is an agricultural group in Kemerovo Oblast. There is enough experience to draw generalizations.

It must be said that the incorporating of agricultural groups into the fabric of the "city--industrial site" system has been the most difficult stage. A sort of psychological barrier had to be overcome by the designers and by the supervising departments. For in addition to the advantages they also saw that certain problems, for instance, environmental conservation, became more complex.

If the "city--industrial site" system in a simplified form is shown as a spatial model where circles are used, on the one hand, to designate the city and, on the other, the industrial site, with the appearance of the agricultural group there will be a model with three circle elements. These are linked together by a common energy source and by cultural, technical and social complexes. Here are the variations for the placement of the agricultural group in the industrial center:

- a) On the utility lines between the city and the industrial site;
- b) Away from the utilities but connected to them;
- c) Away from the industrial site but connected to its utilities;

d) Away from the city but connected to its utilities.

The last three variations allow the creation of a separate satellite settlement.

The placement of the Usolye-Sibirskoye group in the industrial center corresponds to the third variation. It has its own settlement of Belorechensk with 10,000 inhabitants. The experience of the group has shown that due to the sharing of utilities the length of them can be increased and thus it is possible to guarantee the veterinary-sanitation isolating of it.

The Melnikovskiy group is located in the industrial center following the fourth variation also with a settlement of 10,000 inhabitants (Markovo). The Ziminskiy group (Irkutsk Oblast) is located in the industrial group following the second variation but does not have its own settlement. The housing is planned in Sayansk, the future city of the industrial center.

Each of these agricultural groups is designed for 100-150 million rubles of capital investments. The first (Usolye-Sibirskoye) is virtually complete, the second (Melnikovskiy) has gone through the peak of its development and its construction will be completed evidently by the start of the 12th Five-Year Plan. The construction of the Ziminskiy agricultural group started in 1982. Such major construction projects can no longer be termed experimental and one can speak of the unity of the idea of an agricultural group in an industrial center also from the viewpoint of design decisions.

In discussing the experience of building and operating the agricultural groups at the Irkutsk CPSU obkom and the oblispolkom, the rhythmical and effective operation of the new structure was commented on. The example of the most complete Usolye-Sibirskoye agricultural group was particularly stressed. Both the enterprises and the Belorechensk settlement are supplied with heat, water, electric power and sewage from the Usolye Chemical Combine using common utilities. More than 5 million rubles of capital investments were saved merely by the pooling of the utility networks.

The enterprises in the group operate profitably. Over the year the poultry farm earned 4.86 million rubles of net profit, the hog farm earned 4.4 million and the hothouse combine 0.75 million rubles. For producing a quintal of pork the labor expenditures were 3.3 man-hours, while for the hog raising sovkhoses in the oblast the figure is 10.1; feed consumption was, respectively, 5.5 and 7 units per quintal of product.

Of course, not everything has gone smoothly in the development and operation of the agricultural groups. For example, the Usolye-Sibirskoye which was planned with the completing of a treatment plant at the industrial center with a capacity up to 100,000 m³ a day would be complete in 1980 but this was delayed 2 years. As a result, there was an overload and abnormal operating conditions developed. The reconstruction of the TETs which had been planned in 1978 also fell behind the growing needs. The delay in completing the sewage treatment works at the Irkutsk industrial center has delayed the development also of the Melnikovskiy group. The start of work for the Ziminskiy group was planned in 1979 but has been drawn out for reasons which do not depend upon it.

Such typical circumstances impede the normal and effective development of the agricultural groups in the industrial centers. The industrial departments which plan industrial centers in new regions and the sectorial general design institutes do not consider the organizing of the "city--industrial site--agricultural group" systems as effective. The incorporating of the group in the industrial center for this reason occurs at the expense of the already allocated energy and other resources of the city and this is not always simple.

The general design institutes call in specialized subcontractors for designing the city in the industrial center, including Giprogor [State Institute for the Designing of Cities], LenNIlgradstroitel'stva [Leningrad Scientific Research institute for Urban Construction] and others. The institutes make a thorough study of the modern housing and social complex and its requirements and for this reason see the necessity of establishing an industry for farm products in the industrial center. Thus, LinNIlgradstroitel'stva, the author of the designs of Sayansk, included the Ziminskiy agricultural group with an estimated cost of over 140 million rubles in the general plan of the city worked out by it. The group included a large hothouse combine, a hog farm, a broiler farm and a combined feed plant. Giprogor in designing the housing centers in the north of the nation has provided analogous solutions, however these were turned down during the review stage. Now Giprogor would scarcely try to promote this idea in its work.

Obviously, it is a question that, regardless of the promise of the idea of locating an agricultural group in an industrial center and its affirmation by practice, it has not gained a normative or legislated status which would make this innovation compulsory. And compulsory for the entire chain of planning and designing: for the agricultural sector which finances and organizes agricultural production, for the industrial sector which is creating the industrial center and for state supervision and for the scientific organizations which work out the scientific and technical concepts and norms for such placement.

In locating the agricultural group it is essential, for example, to show that the thermal power from the TETs is cheaper than the heat from the agricultural complex's own boiler. That common treatment facilities in the industrial center are more effective and reliable than local ones. That for the agricultural sector it is better to invest money into the expansion of the TETs than to build and operate its own boiler with the constant risk of its breaking down. That it is better to allocate a portion of the industrial center's energy resources to the agricultural group and thereby resolve the food problem in the region radically.

The time has come to thoroughly examine and assess the idea of locating the agricultural groups and creating conditions for its fruitful utilization. Delay multiplies the number of negative examples: the industrial centers in the Kansk-Achinsk Energy Complex [KATEK] are being created without agricultural groups although the main wealth of the KATEK is cheap energy. The Achinsk hog farm with 108,000 head uses its own boiler and so forth.

There are no agricultural groups in the centers being organized around the power giants in Krasnoyarsk Kray. The future industrial centers in the zone of the BAM [Baykal-Amur Mainline] such as Neryungri, Tynda, Magistralnyy, Takino and

others are being designed without agricultural groups and the wagering on subsidiary farms has not yet been reinforced with practical calculations and plans. But when the leaders of the industrial departments which are creating their own industrial centers conclude that an agricultural sector must be located in the region, the time will have been missed, the energy resources allocated, the rational possibilities in the general plan of the industrial center lost and ultimately the creating of normal production and living conditions for the collective will be drawn out.

The legislative reinforcing of the practice of establishing agricultural groups in the industrial centers and the eliminating of interdepartmental differences are an imperative demand for developing the new regions.

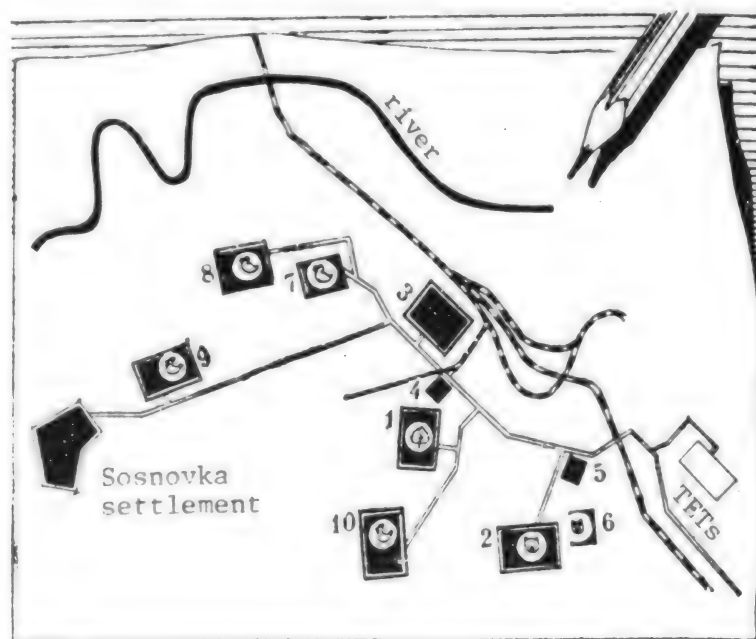


Diagram of Usolye Group of Agricultural Enterprises

1--Hothouse combine on 3.2 hectares; 2--Hog farm for 108,000 head a year; 3--Residential settlement for group of enterprises with 5,000 inhabitants; 4--Combined feed plant for 500 tons per day; 5--Water treatment plant and repair-operating base; 6--Hog breeding farm for 440 sows; 7--Duck farm for 9,000 tons of meat a year; 8--Duck farm for 9,000 tons of meat a year; 9--Poultry farm for 920,000 layers; 10--Poultry farm for 920,000 layers.

It is a question of locating agricultural groups which bring together a limited range of agricultural products on an industrial base, the hothouse growing of early vegetables, the fattening of pigs, egg and poultry meat production and sometimes a dairy complex, large feed production and auxiliary shops. The experience on which one must rely does not go beyond the limits of this list. But why should a group with a high production concentration not employ new

biotechnologies which convert the complex into a self-contained and waste-free one? Certainly the enormous amounts of diverse organic products are not only rich fertilizer for crop raising but also raw materials for the biotechnology of bacteria (yeasts), fungi (mushrooms), algae (Chlorella), mollusks (Dreissensia [zebra mussel]), and insect larvae used for feed. Pond fish raising is also closely related to this. An ideal version for the location of such production would be an agricultural group in an industrial center with stable power production, a high cultural-technical potential and a tendency for a self-contained production cycle without the release of anything undesirable into the environment.

The development of an agricultural group in a region's industrial centers cannot help but influence the structure and location of other systems utilizing land that is suitable for crop raising. Above all conditions arise for the specializing of peripheral farms. There is no need to duplicate market production of the group and non-market production can be maintained solely for internal needs.

Due to proper placement a steady and dependable rear is obtained for livestock raising in the agricultural groups. Here the breed is improved and with all the changes in market conditions a breeding nucleus is maintained and reproduction is carried out with the greatest effectiveness. Equally advantageous is the cooperation in the agricultural group between hothouse plant raising and crop growing on the peripheral vegetable farms. The group develops new raising methods, the seed stock is maintained while the personnel gain production training and experience.

The locating of agricultural production and the linking of the sociocultural centers with them in the development areas thus acquires broad meaning and is subordinate not only to external circumstances (land, roads and so forth) but also to the demands of specialization and in the social area helps to satisfy the cultural needs of the population.

Here is how a model of an agricultural group in an industrial center looks.

In the center is the agricultural group itself: the production of eggs, poultry meat, pork on an industrial basis, breeding and reproduction and specialized raising of the young animals. Crop raising on an industrial basis on covered and open land and special types of covered ground such as mushroom farms and so forth; a fish products farm, the production of combined feed, a regional base for the repairing of production equipment and a personnel training base. Adjacent to these are subsidiary farms for raising hogs on waste food.

Then come the peripheral narrow specialized farms:

- a) The vegetable-dairy-grain sovkhoses located within a close radius. During the first stage of developing the lands these would be vegetable-dairy ones;
- b) Dairy-grain sovkhoses located within the medium radius. In the first stage of developing the lands these would be dairy sovkhoses;
- c) Meat-grain sovkhoses located in the far radius. In the first stage these would be fattening and sheep raising sovkhoses.

In the model one can clearly see the simplifying of production and the ever-narrower specialization as one moves from the most complex structural unit (the agricultural unit) to the peripheral meat-grain sovkhoz. The model envisages basing the most complex types of production on the high technical and energy potential of the industrial center. This presupposes a high level of the socio-cultural complex for crucial types of production and a developed base for training the personnel. It also serves as a barrier against the loss of workers from the peripheral farms.

In the scheme there are also weak points although these must not be considered among its organic shortcomings. As yet we are still behind in a scientific search for agro-economic and technological ways for utilizing the organic matter within the group, there has not been sufficient analysis on the integration of management and as yet the working out of the placement standards and procedural leadership is weak. But even in its present form the placement scheme is of interest for rapidly developing areas.

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UNIFORM CALCULATION OF CAPACITY UTILIZATION PROPOSED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 20-26

[Article by K. K. Shteyman, chief of the Subsection for Capital Investments, Design Work and Equipment of the USSR Gosplan in Moscow: "Are We Correctly Estimating Production Capacity?"]

[Text] Is it worth investing large amounts of money in the development of one or another type of production? The answer to this question depends largely upon the methods of evaluating current capacity.

In recent years, a practice has developed whereby production capacity as well as the indicators of its utilization are determined by the enterprises and associations themselves or (in certain instances) by the ministries. Here not enough attention is given to the main factor for the effective load on capacity, that is, the maximum utilization of the annual equipment operating time fund. Only by this is it possible to explain the paradoxical situations where enterprises operating only 2,200-2,500 hours a year report capacity utilization of over 90 percent while production with a working time balance of around 5,000 hours have a capacity utilization factor within 78-80 percent. One is struck by the fact that the same types of production under different departments plan an annual equipment operating time fund differently proceeding from how this has developed traditionally in the sectors.

Thus, the USSR Minlegprom [Ministry of Light Industry] determines plant capacity for producing shoe-sole rubber considering two-shift working conditions (14 hours a day for 305 days a year or 4,270 hours), while the capacity of rubber plants of the Minneftekhimprom [Ministry of Petroleum Refining and Petrochemical Industry] is determined considering three-shift operations (23 hours a day for 272 days a year or 6,256 hours). A similar situation exists in determining cardboard production capacity within the system of the Minlegprom and the Minbumprom [Ministry of Timber, Pulp and Paper and Wood Processing Industry]. The printing shops or plant printing offices in the manufacturing sectors operate with a shift factor, as a rule, below one while the specialized printing plants and printing enterprises usually operate on three shifts. There is a similar difference in machinery utilization in the plastics processing shops of various enterprises and sectors in comparison with specialized chemical production.

The capacity of textile enterprises in the designing of new mills is determined proceeding from two-shift operations and after they are put into operation, as a rule, this is recalculated for three-shift. In the instrument building, engineering, metalworking and radio electronics industries (with high labor intensity) opposite trends occur with the designing of three-shift operations as actual two- or single-shift work.

Thus, the indicator of capacity utilization in percentages for the industrial sectors, subsectors and enterprises, without considering the number of working hours, is not an objective depiction of the equipment load factor. From the table one can see that even in the subsectors of a single sector there is no uniform approach to determining this.

Indicators for Capacity Utilization in 1981
for Certain Subsectors of the USSR Minlegprom
(from the Data of the USSR Central Statistical Administration)

Product	Capacity Utilization in Report Year, %	Operating Coefficient
Cotton thread	81.9	0.819
Washed wool	90.4	0.904
Single filament cotton thread	82.9	0.829
Rough cotton textiles	87.5	0.875
Wool thread	79.3	0.793
Rough woolen textiles	75	0.75
Knitted fabric	74.1	0.741
Hosiery articles	95.5	0.955
Knitted underwear	94.8	0.948
Outer knitwear	86.1	0.861
Garment products (according to normed output value)	90	0.90
Leather footwear	91.2	0.912

It is hard to say where capacity is more fully utilized: in the cotton spinning subsector operating on four shifts with capacity utilization of 81.9 percent or in producing knitted underwear (94.8 with two-shift operations).

Many machine building plants which operate with a shift coefficient of around 1.2 report 90-95 percent capacity utilization. In calculating enterprise capacity, often an analysis is lacking of which of the adopted operating modes is optimal and most effective for the given industrial sector. Such a neglect tells with particular negativeness in the use of the annual working time by the same type of enterprises located on the territory of the same region or oblast. This, aside from all else, leads to a sharp increase in personnel turnover. As a result of the differences in the calculation procedures, discrepancies arise between the basic and auxiliary shops and services, the production system and the utility support facilities.

The lack of a single approach to assessing capacity utilization extremely complicates the question of summing up the results of the socialist competition. One could mention as many instances as one likes where enterprises having a low shift coefficient were winners in the socialist competition of their rayon, oblast or sector, at the same time that production operating under more intense conditions was among the lagging. Thus, an important component in assessing the operation of the enterprises, associations and sectors is turned upside down.

But this is still not all of the consequences of the fact that determining capacity has been left to the enterprises, associations or ministries themselves. In accord with the Decree of the CPSU Central Committee and the Council of Ministers on Improving the Economic Mechanism of 12 July 1979, the advisability of new construction should be determined proceeding from the utilization of the existing production potential. For this reason the question of how the amount of this potential is established plays a most important role in determining the capital investment volumes.

Over the last 20 years in a majority of the world's developed nations, the value of creating a single work area has increased sharply. Thus, according to the data of the State Design Institute No 1 of the USSR Minlegprom, in the textile industry of West Germany and certain other nations, this has risen by 4-fold. Abroad they have converted from two-shift to three-shift operations in the aim of more fully utilizing (in terms of operating time) the expensive equipment being installed in a number of the industrial sectors.

Increasing the shift coefficient for equipment operation is of enormous importance also for our industry. For example, the question arises of whether an automatic line which replaces lathes or milling machines and costs scores of times more should operate less than 20-30 percent of the annual calendar time fund? This applies to all types of new equipment in the various sectors of the manufacturing industry. For example, the cost of a loom over the last 15 years has increased from 1,000 rubles to 8,000-10,000 rubles and for individual types of machines has reached 30,000 rubles with a decline in the shift coefficient for the operation of this equipment. Analogous examples could be given for the prices of spinning machines and many types of dyeing-finishing and preparatory equipment.

Any additional material incentives which make it possible to more fully utilize installed equipment (in terms of the number of operating hours a year) require significantly less expenditures than the construction of new enterprises. Under the conditions of the scientific and technical revolution, there has been an abrupt shortening of the obsolescence life of equipment and technology. Inevitably the idea arises of the fuller utilization of equipment in all the manufacturing sectors of industry. This would make it possible within a very short time, without additional expenditures and basically by increasing the organizational level of management and improving the material incentive system, to sharply increase product output at existing enterprises as well as increase the indicator for the return on investment and reduce the consumption of thermal and electric power. Within the limits for the capital investments and construction-installation work set for the national economy it would be possible to channel significant additional amounts of capital investments into building housing and other sociocultural projects instead of building new

enterprises which would then operate less than 30 percent of the calendar time.

For more fully utilizing the created production potential of the nation and for increasing the economic effectiveness of production and the capital investments it would be advisable for us to calculate and establish by directive an objective annual equipment operating time fund for the same type of enterprises and production, regardless of their departmental affiliation. This would be a basis for comparing the enterprise performance as well as for working out capacity utilization standards. Without this the work on performance and analysis of production capacity utilization would be largely useless.

An important question is determining the optimum level for production capacity utilization. The USSR Gosplan has approved standards for the development of production in operation but there virtually are no standards for the utilization of operating capacity the amount of which is scores of times more. For this reason, in drawing up the draft annual and five-year plans, many questions and much confusion arise over the question of the utilization level of existing capacity. Certain specialists feel that the utilization level should be 90, 93, 95 and even 100 percent, forgetting that without a capacity reserve it would be impossible to ensure the development of new product types as well as production reliability. Such a procedure of capacity planning is completely to the liking of the ministries which envisage an increase in the production volume from the base but rarely analyze just what this achieved level represents.

It would be advisable to set standards for production capacity utilization for all industrial subsectors and types of production without exception on the basis of a directive set annual equipment operating time fund. This would make it possible to increase the return on investment in industry and more rationally allocate the consumption of energy resources in terms of time.

Naturally, the directive setting of the annual equipment operating time fund and the standards for capacity utilization by itself would not alter anything but it could disclose existing reserves and suggest the ways for increasing production and capital investment effectiveness in the manufacturing sectors.

A rise in the shift factor is not a simple question, particularly with a manpower shortage. It requires not only the eliminating of the disproportions between the shops and sections and better utilization of labor resources at individual enterprises but most importantly a single technical and personnel policy in the region. The national economic effectiveness of production capacity at different enterprises in the region can vary so much that it would be better to convert two enterprises to single-shift operation so as to have three full shifts at the third. The normal utilization of capacity should include the replacement of obsolete equipment and the elimination of disproportions in the individual transfer processes within the enterprise or production association and so forth.

Such an approach requires a fundamental organization in the existing practices of capital investment planning for the national economic sectors and industry. Instead of differentiated limits for capital investments and construction-installation work presently assigned to the ministries and departments for

specific activities such as production construction, housing construction, the building of children's preschool institutions and so forth, obviously it would be better to set a uniform capital investment limit having given the enterprises the right to allocate them themselves in order to achieve the most rapid maximum national economic effect. This would make it possible, simultaneously with improving capacity utilization at existing enterprises, to better solve the social questions.

In line with the enormous scale of the created production potential, the maintaining, effective utilization and replacement of the existing fixed capital should be incorporated in the system of planning indicators. The economic necessity has arisen of working out plans for the major overhaul of buildings, structures and equipment on all levels and be a component part of the plans for capital construction, material-technical supply and financing.

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WAYS TO REDUCE COST OF INDUSTRIAL PLANTS TRACED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 27-37

[Article by Yu. N. Khromets, Doctor of Technical Sciences and Director of the Central Scientific Research and Design Institute for Industrial Buildings, and E. A. Nargizyan, Candidate of Technical Sciences and Section Head from Moscow: "How To Reduce the Costs of Building New Enterprises"]

[Text] Changes in proportional capital investments into industrial buildings have been characterized by an increased cost of 1 m² of area. Since 1952, this has increased by approximately 1.7-1.8-fold and the expenditures of steel and concrete have risen. This is explainable by the action of the following factors.

The industrialization of construction and the related transition to skeleton-type buildings from prefabricated reinforced concrete with the use of light structural elements. On the one hand, this is a progressive path helping to raise the technical level of the entire construction process, starting from the plant manufacturing of the elements and ending with their installation. Due to this, labor productivity has risen and the construction time of the buildings has been shortened. But, on the other hand, the use of skeleton-type buildings from prefabricated reinforced concrete has led to an increase in proportional capital investments.

The shifting of construction to the Eastern and Northern regions of the nation. The increased proportional capital investments into industrial buildings has occurred, in the first place, because of the increased zonal estimates for various types of construction-installation work and, secondly, due to the increased material intensiveness caused by the severe climatic conditions, by less good hydrogeological factors and so forth. The cost of the above-ground parts of production buildings in Chelyabinsk averages 3.3 percent more than in Moscow Oblast and in Tayshet in Irkutsk Oblast, some 23.8 percent more.

The increased social demands on industrial buildings in terms of comfort and production efficiency and the related increase in expenditures on improving the ventilating systems of the buildings and in a number of instances their replacing with air conditioning systems and improved aesthetic qualities of the interiors; an increased level of illumination and reduced noise; the increase in the area of cultural and service facilities per worker.

Protection of the surrounding environment. For a decrease and complete elimination of harmful emissions, additional investments are needed for ventilation and water purification systems as well as stipulating these in the designs.

Table 1

**Factors Influencing a Change in Proportional Capital Investments
in Building Industrial Buildings: Increase (+), Reduction (-)**

Group of Factors	Factors	Nature of Factor's Effect	Proportional Amount of Factor, %
Construction	Industrialization of construction	+	45-50
	Improving layout and designing of buildings	-	12-14
	Improving designing methods	-	3-5
Economic-Geographic	Change in territorial structure of industrial production	+	7-8
Operational	Increase in social requirements	+	23-25
	Greater demands for environmental conservation	+	
	Reconstruction in process of operation with minimum production losses	+	
	Improved operational reliability	+	
	Improved heat engineering qualities	+	
	Improved aesthetic qualities	+	
	Influence of scientific-technical progress	-	

The adapting of the layout and design decisions to possible future modernization of production equipment. The client enterprises gain from this both during reconstruction and in the expenditures on carrying it out. But the proportional capital investments into the erecting of industrial buildings are increased by approximately 10 percent.

The necessity of saving energy resources has required improved heat engineering qualities in the enclosing structures of the buildings. The thickness of the single-layer enclosures and the expenditure of thermal insulating materials in multilayer ones have increased, the heating and ventilating systems have been improved for recovering the heat released in the production processes and, ultimately, the proportional capital investments are increased. It must be pointed out that this factor began to be apparent only in the 10th Five-Year Plan, however its influence over the long run will undoubtedly grow.

How can we reduce the influence of the factors which increase the cost of industrial buildings? Let us point out the most effective ways.

The Rational Placement of Industrial Enterprises

Up to the 1970's, industrial enterprises were designed individually and their location on the nation's territory was little interrelated. In 1973, the USSR

Ministry and Gosplan approved a regulation governing the procedure for designing, planning and financing the construction of general projects. The prerequisites appeared for the grouping of enterprises in industrial centers.

Industrial centers with common utilities, communications and auxiliary production and recently with the pooling of basic types of production, a unified system of domestic services for the workers and their families and with a rational solution to the architectural, layout and urban development problems have shown indisputable advantages and provide a significant economic effect in comparison with the individual construction of the enterprises.

According to the data of Glavgozeksperitiza (Main State Expert Evaluation Administration) of the USSR Gosstroy, by 1980, more than 400 general plans for industrial centers had been worked out and approved and these included more than 5,000 enterprises. The cost of their construction was over 60 billion rubles, including 9.5 billion rubles for center-common projects. The cost was reduced by 1.8 billion rubles in comparison with the separate location of the enterprises while operating expenses were reduced by 150 million rubles. Here the area of the developed territory was reduced by more than 15,000 hectares, the length of rail lines by 1,000 km and roads by more than 700 km (see Table 2). The group placement of the enterprises has made it possible to most fully solve the questions of environmental conservation, the optimum placement of the industrial enterprise zones as well as the urban development questions.

Table 2

Distribution of Economic Effect from Improving Design Decisions

Type of Design Decision. Nature of Improvement.	Proportional Amount in Total Volume of Cost Reduction,
General plan	15.4
including:	
a) Improving utilities on site territory	6.9
b) Reducing the developed area	5.1
c) Other	3.4
Design decisions	23.8
including:	
a) Improving foundations of buildings and structures	9.3
b) Improving frame	4.2
c) Other	10.3
Technological solutions for basic production and auxiliary production projects	26.6
including:	
a) Increased equipment capacity	9.8
b) Optimized location of production equipment	7.7
c) Improved system of power, heat and water supply	5.6
d) Other	4.0

However, as a whole for the nation the establishing of industrial centers has gone on slowly. While in Belorussia and Lithuania over 60-70 percent of the enterprises is located in industrial centers, the overall figure for the nation is just 12 percent. At the head of this undertaking in Lithuania and Belorussia are the republic gosplans and gosstroys while the Section for Industrial Centers of the USSR Gosstroy was eliminated several years ago.

The effect of establishing industrial centers is also determined by how successfully the interdepartmental problems are resolved. For example, the joint location of chemical and concentrating production is very effective. The Aktyubinsk Phosphorite Basin is one of the major raw material sources of the mineral fertilizer industry in the Soviet Union. The reserves of the basin are sufficient for industrial utilization for many decades to come. Here they have proposed building several large mining-chemical enterprises.

The problem of protecting the environment in this area is not only of regional but also republic-wide importance. If production is carried out according to the presently adopted method, the amount of wastes just in Aktyubinsk Oblast after the basin reaches full capacity will be 3-4-fold more than at present for all of Kazakhstan! The wastes will occupy over 100,000 hectares of territory.

For solving the problem two directions have been chosen: the revising of the production systems for reducing the amount of wastes and the maximum employment of the wastes in producing new additional products. The research carried out has shown that the flotation tailings from the Aktyubinsk phosphorites (the largest waste product) are suitable as a raw material for producing many widely employed building materials such as silicate brick, concrete and reinforced concrete articles, construction mortars and so forth. They can be used instead of sand in road, housing and industrial construction.

From the phosphogypsum it is possible to produce sulfuric acid, lime or cement. The sulfuric acid can be returned to fertilizer production and this will reduce the scarcity of the raw material, reduce the amount of its shipping and eliminate the phosphogypsum dumps.

As a result of the research a new scheme was proposed envisaging the establishing of unified industrial complexes on the basis of the basin's individual deposits and producing mineral fertilizers and building materials. As a raw material for the building materials they will use the concentration wastes as well as the ash from the TETs and the chemical production wastes. This will make it possible to reduce the consumption of scarce materials.

The combined placement of concentration and chemical production creates unified chemical-mining enterprises with maximum cooperation not only in the utilization of the waste products but also for organizing the production methods, for utilizing the secondary energy resources and for establishing a common transport system, subsidiary production and auxiliary facilities, management systems and so forth.

With such a solution, a number of the technological and transport operations traditionally employed at concentrating mills is eliminated including drying, storing, the dispatching and transporting of the phosphorous concentrates.

Concentrate in the form of pulp is delivered to chemical production directly from the condensers. The system of the concentrating mill is simplified. The production area of the buildings is reduced to 2/9 the previous area, steel consumption to 10/51 and cost by 10/31 than previously. Working conditions improved. Due to the eliminating of the basic forces of dust production, the enterprise ceases to be dangerous for silicosis.

The waste heat from the processing of the phosphogypsum (120 gigacalories per hour) completely covers the demand for heat in the concentrating mill, including production requirements, heating and ventilating of the buildings. Construction of a special heat source is not required for this.

Improving Layout and Design

With an increase in the area of a production building, there is a noticeable decline in the cost of a unit of a production area and hence operating expenditures. At the same time an analysis of the plans made in recent years by the institutes of Glavpromstroyproyekt [?Main Design Institute for Industrial Construction] of the USSR Gosstroy shows that the number of small buildings in domestic construction practices is still rather high.

The combining of different production processes in a single building is an effective and tested method for increasing the area of the buildings. Here the principle of combining can and should be extended not only to the shops of one enterprise but also to groups of industrial and utility enterprises within the city limits. In this instance it even assumes greater importance. It is advisable to combine dairy and meat processing plants, bakeries, the warehouses for food and industrial products, refrigeration capacity and vegetable storage facilities, municipal garages, laundries, furniture repair enterprises and so forth. Unfortunately, typical of current practices is the building of these enterprises in the form of separate projects located on separate sites with a full range of subsidiary production. And while the principle of combining is at least rarely employed in building the basic production structures, the auxiliary and ancillary services, as a rule, are located in small, separate standing buildings. Here combining could be carried out both in separate standing buildings of rather large area (for example, the complex of auxiliary shops at the VAZ [Volga Automotive Plant]) as well as in buildings and quarters attached to basic production.

The integrated elaboration and coordination of the technical and construction parts of the plans would make it possible to obtain the greatest economic effect. Unfortunately, often a lack of coordination is observed in the technological and construction designing. For example, this can be judged from the ratio of the bearing capacity of the structural elements in multistory buildings and the loads working on them. As an average the load is around 24 percent. Thus, the bearing capacity of the structural elements is only one-quarter used.

Standardizing Building Parameters

A characteristic feature of industrial construction in our nation has been the standardizing of industrial buildings. On the basis of this the level of industrializing industrial construction has been increased and due to this a

significant portion of the labor expenditures has been shifted to the sphere of manufacturing prefabricated elements and the labor intensiveness of the work done directly at the construction site has been reduced. This creates opportunities for standardizing the structural elements, for organizing their mass production and for increasing the profitability of the construction industry enterprises.

The standardizing of layout and design decisions for industrial buildings as has been carried out in our country on a statewide scale has played a crucial role in turning industrial construction into a mechanized process of putting up buildings from plant-manufactured elements and parts. Standardization has occurred in building spans, column spacing, column height, the types and capacity of materials handling equipment, production loads and effects.

However, one cannot help but mention that along with a positive economic effect, standardization in some instances has led to increased expenditures related to the nonconformity of the standardized parameters to the requirements of the specific production methods. Obviously in developing standardization thought must be given to extending it also to the production processes.

The Use of Progressive Building Materials and Elements

The improving of standard structural elements in recent years has been characterized by the broad use of progressive building materials and above all high-strength reinforcing rod, rolled metal as well as high-grade cements. Such designs have been worked out and disseminated by the Standard Design Institute of the USSR Gosstroy. At the same time, their use has been extremely limited. Results of a check on the activities of prefabricated reinforced concrete plants have shown that structural elements for industrial construction comprise around 47 percent of the total volume of plant-manufactured articles. More than one-third goes for elements produced according to obsolete series and individual blueprints while in some place the manufacturing volume of such obsolete elements reaches 50-80 percent.

In our opinion, a substantial improvement in the use of progressive designs can be achieved by introducing territorial catalogs which would most fully consider the specific features of certain regions of the nation. Catalogs should be established for immediate use and long-range regional catalogs should be worked out for specific dates for their introduction. Such a two-tiered system for introducing structural elements and designs will make it possible to promptly modernize the building industry enterprises and prepare them for producing more rational structural elements.

Prices and the Designing Standard

In working out a variation of a design decision for industrial buildings, of great importance is the price level and the presence of economically sound designing standards. It is essential to point out that expenditures on repairs in operating industrial buildings approach 40-50 percent of the total amount of the operating outlays.

The next important question is the level of the rate for heat. As is known, industrial buildings are significant consumers of heat and for adopting an optimum decision on the individual elements (the thickness of the heat-insulating layer of enclosing structures, the sizes of the window and skylight openings in buildings, the shape of the buildings and so forth), the cost of the expended heat is of great importance.

The existing rates have been obtained on the basis of the new price lists for fuel, including liquid and gaseous. In addition, these rates have been set proceeding from heat generation by relatively large boilers and TETs. At the same time, an analysis of the report indicators for the fuel balance for the nation's oblasts and republics has shown that at present (and the situation is unlikely to change in the immediate future), there is a significant number of small boilers in which heat is generated with relatively low technical and economic indicators.

The USSR is an exporter of gaseous and liquid fuel and the price level of the exported fuel is much higher than the prices used in setting the heat rates. If it is considered that up to the year 2000, gas and liquid fuel will remain the basic type of fuel, it becomes clear that the existing rates can distort the comparability of plans for buildings.

We have determined the calculated values for the cost of heat in making economic comparisons and working out standards in industrial construction. The obtained prices were 2-2.5-fold more (depending upon the area).

We feel that in working out standards related to the consumption of thermal and electric power in industrial construction, we must proceed not from the existing rates but rather employ calculated values for the cost indicators of heat and electric power.

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PROPOSED TO IMPROVE BRIGADE FORM OF LABOR

Journal *Trud* EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in *Trud* No 3, Mar 83 pp 38-51

Article by G. A. Klimentov, Candidate of Economic Sciences from the Leningrad Higher Trade Union Cultural School: "What Impedes the Potential of Collective Labor?" [the article is published as a point of departure for discussion]

To Utilize the Advantages of the Brigade Method on the Level of Enterprise Collectives

The opportunities for increasing labor efficiency by its better social organization has still not been fully utilized. This is seen from the experience of enterprises which have introduced the Shchekino method and which have followed the example of the best contracting collectives in construction and transport.

As was pointed out at the 17th Trade Union Congress, "scouts alone, as is saying, do not bring about victory,"¹ and as yet a general change has not occurred in the organization of labor. Working time losses caused by poor organization as before take up a portion of the shift.

The reasons can be seen even by the naked eye. Here is a characteristic statement by the director of one of the shipbuilding yards at a conference for introducing a brigade contract: "In our opinion, and I have spoken with directors saying these to me, we must not change the norm or rate from order to order. Let the brigades reduce the shipbuilding cycles. By this we will obtain the desired increase in labor productivity. As a rule, the workers are repelled by slow growth due to the fact that a piece worker 'cuts into' the time rate. This is a problem for us. We have poorly explained to the worker that you will receive as much as you produce and he is afraid that this applies only this year. When the start of the following year comes, then all the time rates will be raised."

The problem has been pointed up but the proposed solution of not altering the rates can scarcely be called well thought out. This was subconsciously realized by the director himself for when at his yard they converted 11 integrated brigades to a contract in the assembly-finishing shop, the result, in his words, was amazing. Labor productivity doubled! Such growth is not the limit. But can we change the rates here? And for how many years should they not be changed? Would such wages correspond to the principle of distribution according to labor?

The principle of unrestricted piece work (precisely this was mentioned by the director as a way for solving the problem) has been introduced several times into practice, but each time after a more or less extended period they were forced to abandon it due to the unfavorable consequences in distribution relationships. For this reason up to now there have been unceasing attempts to solve the problem employing various, often excessively clever stratagems. We might mention the maintaining of the old rate for 6 months for the initiator of an increased rate, the employment of wage rates increased by 20 percent for converting to technically sound rates, the Aksay method of revising the rates, the Shchekino method, the proposal to split the wage rate into permanent and variable parts for maintaining the appearance of a fixed rate.² But all of these taken together--both the employed as well as the proposed--do not solve the problem completely because they proceed from an assumption that the enterprise administration is interested in maintaining a socially normal intensity of the labor rates or (what is the same thing) in obtaining a taut plan. As a rule, under the conditions of the current economic mechanism this is not necessarily the case and at times it forces the administration to conceal a portion of the reserves, resorting to their use in subsequent years.

Nor is the problem solved by employing collective forms for the organization of labor and wages, regardless of individual records. Thus, in 1981, in the brigades which were newly organized as a whole for the nation, output rose by just 1.7 percent.³ At the Kirovskiy Zavod PO [Production Association], in 30 percent of the studied brigades, output even declined. The Decree of the CPSU Central Committee "On the Further Development and Increasing the Effectiveness of the Brigade Form of Organizing and Encouraging Labor in Industry" pointed out such essential shortcomings in the development of the brigade form of organizing labor: in a number of sectors their organizing had a formal nature, not enough work had been done to improve internal plant planning, the technology and organization of production and labor, the wage systems and so forth. But in the experience of the leading cost-accounting contracting collectives there are accomplishments the development of which creates the prerequisites for successfully solving the problem in the future on a fundamentally new basis. It is a question of the involvement of the brigade members in the distribution of total earnings on the basis of accounting for the labor contribution of each under the condition of the dependence of the earnings themselves upon the result of the joint labor. This new right of the collective in fact includes worker self-control in the brigade and helps surmount the psychology of a "hired worker" among a certain portion of the workers. It also helps to indoctrinate a feeling of being the master of production in them. The above-mentioned December (1983) Decree of the CPSU Central Committee also spoke of the need for basing the brigade's activities upon the broad use of cost accounting principles with wages paid according to the final result and the distribution of wages employing a labor participation coefficient. From this initial point a movement has already started to employ the advantages of the brigades on a level of the enterprise collectives, that is, a changeover of them completely to the brigade system of organizing production, labor and management following the example of the Kaluga Turbine Plant, the SMU-2 [Construction-Installation Administration] of Murmanskpromstroy [Murmansk Industrial Construction Trust], the Put' k Kommunizmu Kolkhoz in Altay Kray and many others.

These collectives from the very outset have followed a policy of reorganizing the production management system on the basis of brigades and have provided extensive opportunities for the workers to take an active part in management from the Brigade Council to the Council of Brigade Leaders in the association. Here the worker becomes not only the master at the work area but also begins to feel himself the master in the production management system. As was pointed out by V. I. Lenin: "...There is a way to socialism, the only way of teaching the workers the practical matter of managing colossal enterprises and organizations in large-scale production and major distribution."⁴ A definite step ahead on this path has been the proposal to include in the large multispecialty brigades the engineers, technicians and production organizers. This was put forward in the Decree of the CPSU Central Committee "On the Further Development and Increasing the Effectiveness of the Brigade Form of Organizing and Encouraging Labor in Industry."

The dream of the collectives at such enterprises is to obtain the present rights of a brigade to determine the amount of bonuses and earnings on the basis of accounting for the labor contribution. "Why not tell us: Here is your plan, here is your wage fund, here are the limits and as for the rest decide for yourself?"⁵ Behind this question in essence stands something unsaid: "When are we going to be permitted without the aid of the centralized wage rates and salaries, to determine the amount of remuneration for labor under the conditions of payment for the end result?"

In order to answer these questions, it is essential at least generally to examine the functioning of the economic mechanism and the economic conduct engendered by it.

Once Again on the Adopting of the Taut Plans

State ownership of the means of production makes it possible to draw up a unified national economic development plan and on a directive basis give this to the labor collectives for which it becomes the law. All the product produced under the plan belongs to society. For this reason, the state directly in the stage of drawing up the plan allocates it to satisfy various needs. A portion of what has been created goes to cover the extended means of production, a second part goes to increase these while a third part is used for consumption. This "consumption pie," as the economists say, should satisfy both public and private needs. In order that the satisfying of personal needs be guaranteed for each member of a socialist society (both to those who are working and to those who have already worked or are already not yet working), a system of wage rates, salaries, pensions and scholarships is employed. The total of all payments should equal the value of the consumption fund. For this reason, strict control is required by the state over the expenditure of the wage fund.

In the aim of more fully satisfying social and personal needs, each year the plans are increased above the achieved level, as the consumption fund grows the wage rates, salaries, pensions and scholarships are revised and new benefits are introduced within the realization of the social programs.

It is assumed that all workers are interested in the development of production and through the bodies of Soviet power, the trade unions and other public

organizations should take an active part in reviewing the draft plans, and after their approval, in seeking out additional opportunities for their maximum overfulfillment at each work area. It is understood that such conduct, in being encouraged materially and morally, and realized through participation in the socialist competition, makes the plan tauter.

It must be said that all that we are rightly proud of today as achievements of a developed socialist society has been created on the basis of precisely such a model of the economic mechanism. However, as social production has developed and the relationships of the economic units have become more complex, the shortcomings inherent to it have become evermore apparent.

It has turned out that while in the stage of drawing up the draft plan, the collective incorporates in it all its real possibilities, after the approval of the plan it is unable, as a rule, to participate in the socialist competition for its overfulfillment. As soon as such a competition becomes a mass phenomenon, the enterprise administration is confronted with a dilemma: to consider all the possibilities in the plan for the sake of social interests and as a result end up outside the competition participants for its overfulfillment or conceal a portion of one's possibilities from the planning bodies and gain a real opportunity for successful participation in such a competition which is encouraged materially and morally. Even if the possibilities concealed from the planning bodies are later included in above-plan activities, in this instance there are material outlays and moral harm due to possible disproportions. But the administration, in remembering the need subsequently to overfulfill the plan which has been increased from the achieved level, will in no way endeavor to include all the concealed possibilities in the socialist obligations. Moreover, in order to carry out all the increasing plan quotas, the enterprise administration at times begins to request allocations for production development from the superior economic managers even when there are reserves present for increasing product output. Of course, funds are allocated not for all requesters. First of all, opportunities to develop capacity are obtained by those sectors the products of which are most essential for society. Nevertheless, it often turns out that the allocated funds are not completely used or do not provide the proper return.

Such a situation can be explained by the fact that the money is requested by some leaders while it should be utilized by others. The construction workers, in turn, in the first place, do not utilize all the allocated capital investments as they also are not interested in fully disclosing their capabilities and, secondly, even in completing the amount of work in rubles incorporated in the plans do not always turn over completed projects to the client.

In knowing the reticence of many managers to inform the planning bodies of their real capabilities, the workers from these bodies plan for all subdivisions an increased production volume, in not being particularly concerned with the soundness of these plans. When the shortcomings of the planning bodies are actually confirmed, the plan quotas are adjusted downwards. In order not to disrupt the overall volume growth and to ensure the fulfillment of the general plan, the quotas are increased for the enterprises which successfully fulfill and overfulfill the plans, considering not without justification that the initial plans were set below the real opportunities. Here both, as a rule, receive

fully the wage fund and the economic incentive fund. It is not hard to see that the balance established in the initial plans is inevitably disrupted and the problem of material-technical supply is aggravated.

As a result of the designated practice, everywhere the overfulfillment of the plans ceases to make sense and adjustment becomes a pretext for a reticence to use the existing opportunities. "Such a practice disorganizes the economy, it discourages the personnel and accustoms them to irresponsibility."⁶

Does the Wage System Encourage the Utilization of All Reserves?

The negative effect from this model of the economic mechanism is not restricted merely to the economic management sphere. It also directly involves the executors of the most diverse production levels. For them, this model means a guaranteed wage in accord with the skill and working conditions for a performed standard. The wage rate is determined in the state level and cannot be arbitrarily altered, as it is linked to the consumption volume obtained as a result of all material production. In order that this consumption volume increase more rapidly, a personal material interest must be developed in each worker to increase his labor contribution and to increasing the standard. The wage rate by itself, regardless of its amount, does not create such an incentive. For this reason, the task of revising the standards is entrusted to the enterprise administration and trade union committee and to a special state system of encouraging labor.

The revising of the standards is most often disadvantageous for the administration as the true capabilities of the enterprise may be exposed and this could lead to an increase in the plan quota. The state system for encouraging labor also does not provide a satisfactory carrying out of the task. With time wages the workers are not interested in increasing the output rate and with piece wages they are interested even in reducing the intensity level of the rates as they receive an additional payment above the wage rate for overfulfilling the standard. Since there is a significant overfulfilling, the rate is increased while the piece rate for the article is reduced and it becomes disadvantageous for the worker to significantly overfulfill the standard or quota if this does not involve a further rise in wages. This very increase within the enterprise is restricted to the wage fund determined by multiplying the average wages by the regular number of workers. With the given average wage the opportunity to earn above the average level will exist only in the instance that a certain portion of the workers either produces less or agrees to receive below-average wages. Hence the drive for easy jobs, the development of adaptations which accelerate work and which not every worker is willing to share with comrades and at times the absence of concern for the growth of the young workers. An annual rise in average wages linked to the growth of labor productivity leads to a decline in the quality of the standards or to a rise in the skill categories without improved skills if the wage rate remains unchanged. With each passing year the share of the rate in the wages declines while the share of additional surpayments grows.

If we can now attempt to generalize the shortcomings examined by us in the current model of the economic mechanism, they obviously are to be found in the distribution system which does not create a constant incentive for the fuller

utilization of our possibilities. And the more the desire to interest the labor collectives and individual workers on the basis of the wage rate system, the less they have been interested in a sound plan and standard. Lenin's demand upon distribution as a method, implement or means "for increasing production" is hard to carry out with the wage rate system.

Even specialists at the Goskomtrud [State Committee for Labor and Social Problems] do not deny the insufficiently stimulating role of wages based on the wage rate system but they have endeavored to resolve the problem engendered by the rate system on the basis...of the same rate system by giving it a more flexible character! What this results in has been pointed out, for example, by D. Pisarev, the leader of an assembly brigade at the Dneprot'yazhbummash [Dnepr Heavy Paper Machine Building] Production Association imeni Artem: "A prudent or rather unconscientious worker will conceal his reserves so adroitly that not even a timekeeper can uncover them. Such a worker for many years can overfulfill the quota by 104-105 percent (it is a question of technically sound quotas--author's note), he can fulfill the quota for reducing labor expenditures but will be far from fully utilizing his possibilities."⁸ Under these conditions, the insufficient conscientiousness of a "prudent worker" is materially encouraged when they allow him to increase by 20 percent the rates for using such "technically sound standards." But is not the rate increased by 20 percent the very same "flexible" wage rate which more and more labor specialists are in favor of using?

To this we must add that, according to the data of sociological research, the share of workers ready to increase their contribution under the condition of the conformity of earnings to this contribution reaches 70 percent.⁹

It is far from accidental that the most conscientious part of the workers, in organizing brigades operating on a single schedule order, has begun to allocate collective earnings on the basis of considering precisely the labor contribution, using either a conditional category or a coefficient of labor participation (KTU). However, this cannot solve the problem as a whole, as it is essential to reorganize the entire economic mechanism on the basis of accounting for the labor contribution in planning production and in distributing what has been produced.

What Can Be Done

In utilizing the normative method for planning the wage fund in accord with the Decree of the CPSU Central Committee and the USSR Council of Ministers "On Improving the Economic Mechanism" as adopted in July 1979, there is in essence an opportunity for resolving the important problem of improving the economic mechanism. The revolutionariness of the measure is that an attempt has been made to link payment to the product of labor and not to the worker (labor force) and not for the individual piece worker but rather for the entire collective. "A new form of controlling the measure of labor and the measure of consumption"¹⁰ has appeared and this should replace, in our opinion, the old form of control based upon the wage rate system and lead ultimately to a change in the economic model of the current economic mechanism and to a method of distribution which links the payment with the end result of the collective's work.

In this context, it is logically essential to convert to brigade forms of organizing labor with payment for the end result under the conditions of cost accounting, granting the brigade collective or a council elected by it the right to determine the amounts of bonuses and earnings considering the real contribution of each brigade member to the overall work results. The Decree of the CPSU Central Committee on the brigade form of organizing labor (December 1983) should play a major role in accelerating this transition. This decree pointed to the necessity for all the party bodies to go more deeply into the activities of the associations and enterprises in introducing the brigade form of organizing labor and to increase the responsibility of the economic leaders for establishing the necessary conditions for the high quality and productive work of the brigades.

What is the reason for the inability of a portion of the managers to creatively carry out the adopted decisions and assume their share of responsibility?

In the first place, in spite of the demand for payment for the end result in accord with the labor contribution, the payment of each worker as before is related to the wage rate for salary and this for the most active part of the workers may threaten a decline in the achieved level of earnings and in no instance eliminates the artificial "ceiling" in wages, while for the engineers and technicians essentially nothing has been changed in their current status.

Secondly, material and moral incentives are provided for operating under the counterplans which exceed the quotas for the given year of the five-year plan. The deduction rates into the incentive funds for fulfilling the counterplan are increased by 2-4-fold in comparison with the ordinary plan. Why do this if the wage rate per ruble of net product already forces the enterprises to assume the maximum possible in drawing up the annual plan? In any event, this situation is in obvious contradiction to the demand of the decree on the development of the brigade form for organizing and encouraging labor to precisely take into account the opportunities of the enterprise collective in drawing up its performance and in setting the net product rates on the basis of technically sound standards and advanced production methods.

If the enterprise administration conscientiously takes everything into account in drawing up the performance and the norms, then it deprives the collective of an opportunity to obtain more for the counterplan while if a portion of the production capabilities are hidden, then after the adopting of the counterplan and its fulfillment there will be a larger wage fund and increased economic incentive funds as well as the moral benefit as a participant in the competition for the counterplans.

In our opinion, the possibilities for the ubiquitous and conscientious considering of reserves at enterprises in performance reports and a mass movement for adopting counterplans will be increased if we do not resort to the complete confiscation of the money saved at the enterprise in achieving high results. "The savings obtained by leading enterprises is confiscated under various pretexts," as was pointed out at the November (1981) Plenum of the CPSU Central Committee.¹¹

It seems to me that in maintaining the wage rate system, it will be impossible to fully overcome the force of inertia, tradition and habit as these have developed under the obsolete but still current model of the economic mechanism. Merely by changing this model, that is, by moving completely to distribution based upon a wage rate per ruble of net product considered in the price of each produced product, with the transfer of the right to set the amount of remuneration for labor to the collective itself, as the director quoted by us at the beginning of the article dreamed, is it possible to hope to surmount inertia.

Only by putting into economic practice, net product norms which are considered in the price of each product will society acquire a tool for supervising the labor contribution of the collective while employing a wage rate per ruble of net product provides an opportunity to establish a proportion in distributing the labor contribution for labor for oneself and labor for society.

Not the mechanism of a market regulation of prices but rather the fuller utilization of the advantages of the socialist production method decides the fact that the price of any product should reflect the following: the social expenditures on the implements of labor which are partially included in the production of an individual product (amortization deductions) and those going subsequently to the budget for forming the replacement fund; the expenditures of labor by other collectives which are completely incorporated in the production of a product (the norm of material expenditures and production services) and for payments to these collectives; the labor expenditures of the collective itself (the net product norm) with a state-approved proportion for allocation to labor for oneself and labor for society for direct transfer to the budget after the selling of the product.

On the basis of such a price it would be possible to organize full cost accounting within the process of material production and the paid services sphere. It is not the state that should pay the wages to the collective but rather it should earn the wages and even guarantee the receipt of all the funds in the budget and payments with suppliers so that related collectives would not go unpaid. Only in this instance the director not only can but also should receive, along with the collective headed by him, an independence which presupposes control by society over the measure of labor and the measure of consumption. And the links between the collectives--real, production ones--will be in such a rigid system that the failure to deliver a product or delivery above the production needs will be impossible without an immediate punishment. For the collective which does not deliver the product will not receive its wages and will be in debt to the budget, without mentioning the response to the immediate consumer to this. The situation-saving adjustments, padding and other bad phenomena will be useless and disappear like shadows at noon. No one will pay the collective for the overproduction of various products and the collective risks ending up as the loser. For this reason, overproduction loses its sense.

Under these conditions the involvement of all the workers in working out a realistic plan for production activities with detailed regulating of the times and range of the products to be produced and delivered will be vitally essential for the normal course of production and a guarantee for the prompt receiving of wages. Hence, the process of working out and fulfilling the plan can be raised to a higher level and this, as is known, is the heart of national

economic management. The judgment of the effectiveness of the plan itself should be the reduced price level per unit of useful effect in satisfying social demand for various products and which is impossible without carrying out the corresponding specific comprehensive programs. Thus we will achieve increased productivity of social labor and hence a rise in real wages while maintaining the socially normal boundaries of nominal wages.

The rejection of the wage rate system as the basis for controlling wages does not mean either a downplaying of the role of the state in monitoring distribution or the eliminating of guarantees for wages. All the positive functions of the wage rate system can be realized with a much greater effect in establishing wage rates in the prices of the corresponding products. Moreover, in the form of the members of the self-financing collectives, the state gains interested controllers of the measure of labor and the measure of consumption. If a collective, for reasons which do not depend on it, does not earn a minimum wage level, then it can receive this minimum from the emergency funds. With wages exceeding the socially normal level, the state can apply a progressive income tax.

In the thus improved economic mechanism, the collectives are confronted with just one essentially new task, that of determining individual earnings without the aid of the state wage rates and salaries. Even now the workers in the cost-accounting brigades are being instructed in carrying this out. Experience shows that without the help of timekeepers, the workers can determine the standards and promptly revise them.¹² At the Plastopolimer [Plastic-Polymer] Scientific-Production Association (Leningrad), in one of the shops they are already employing an interbrigade coefficient of labor participation for distributing wages among the brigades. The establishing of wage ratios on the basis of recommendations from the state bodies can be carried out within a collective contract. There is no doubt that practice will find thousands of different ways for resolving this problem, if the principle is put to work.

FOOTNOTES

- ¹ "Materialy XVII s'yezda professional'nykh soyuzov SSSR" [Materials of the 17th USSR Trade Union Congress], Moscow, Profizdat, 1982, p 10.
- ² See A. D. Ayzenkremer, "A Standard Can Be Raised But It Is Not Essential to Cut the Rate," EKO, No 11, 1982, pp 114-124.
- ³ "III Plenum VTsSPS, 1982 g., dekabr'. Stenograficheskiy otchet" [The Third Plenum of the AUCCTU, 1982, December. Verbatim Report], Moscow, Profizdat, 1982.
- ⁴ V. I. Lenin, PSS [Complete Collected Works], Vol 36, p 263.
- ⁵ P. Volin, "A Question for the Director," LITERATURNAYA GAZETA, 16 June 1983.
- ⁶ "Materialy XXVI s'yezda KPSS" [Materials of the 26th CPSU Congress], Moscow, Politizdat, 1981, p 50.

⁷ V. I. Lenin, PSS, Vol 43, p 359.

⁸ "Incentives Should Work," TRUD, 15 May 1982.

⁹ See: A. N. Alekseyev, "Social Problems of the Development and Effectiveness of the Socialist Competition," in the book: "Sotsial'noye i kul'turnoye razvitiye rabocheho klassa v sotsialisticheskoy obshchestve" [Social and Cultural Development of the Working Class in a Socialist Society], Part II, Moscow, 1982, p 190.

¹⁰ KOMMUNIST, No 16, 1982, p 7.

¹¹ PRAVDA, 17 November 1981.

¹² See: V. Parfenov, "Brigades," PRAVDA, 27 June 1983.

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PROBLEMS, PROSPECTS OF INTRODUCING BRIGADES ANALYZED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 52-67

[Article by G. N. Cherkasov, Doctor of Economic Sciences, Professor at the Leningrad Financial and Economic Institute imeni N. A. Voznesenskiy, and L. A. Grigor'yeva, Candidate of Economic Sciences and Docent at the Scientific Research Institute for Interdisciplinary Sociological Research under Leningrad State University imeni A. A. Zhdanov: "Ways for Strengthening Brigade Forms"]

[Text] [Editorial Introduction] Around 5 years have passed since the ratifying of the Decree of the CPSU Central Committee and the USSR Council of Ministers on Improving the Economic Mechanism of 12 July 1979 and which envisaged the converting of the brigade forms of organizing labor and wages into the basic ones during the 11th Five-Year Plan. Over a comparatively short period, numerous undertakings and new methods have been tested and definite mistakes have been discovered. Their analysis and the prospects for progress were described in the Decree of the CPSU Central Committee "On Further Developing and Increasing the Effectiveness of the Brigade Form for Organizing and Encouraging Labor in Industry" as well as in the Decree of the USSR Council of Ministers and the AUCCTU "On Measures to Further Develop and Increase the Effectiveness of the Brigade Form of Organizing and Encouraging Labor in Industry." The authors of the published selection of materials have written on the problems related to carrying out the designated tasks and the ways of their practical solution.

How should we understand the turning of the brigade form for the organizing of labor (BOT) into the basic one and what criteria should be followed here? A correct answer determines not only the real production successes and the interests of large numbers of people but also the degree of confidence in the very idea of collective forms of labor.

Let us isolate three interrelated areas in the spread of brigade forms. They are all related to carrying out the tasks outlined in the decrees of the CPSU Central Committee, the USSR Council of Ministers and the AUCCTU on the further

development and greater efficiency of the brigade form for organizing and encouraging labor in industry.

The first is the comprehensive coverage of the labor processes by the brigade form, the wider scale of its introduction and its penetration into all the structural subdivisions of the enterprise, including the sections and shops of basic production, auxiliary and service production and engineer support.

The second area involves qualitative changes in labor. The enterprises are introducing progressive elements which are characteristic for collective labor: working according to a single schedule order or the end result, the employing of comprehensive planning and accounting units and rates, the combining of professions and production functions, multimachine tending, the distributing of wages employing a coefficient of labor participation, brigade forms of cost accounting, a brigade stamp (performance record) of quality, contracts on creative collaboration with engineers and technicians, contracts on cooperation and mutual aid with related brigades, and bodies of worker self-control such as the councils of brigades and brigade leaders. The third area is an improvement in the socioeconomic characteristics of the brigade organization of labor: economic (the fulfillment of production plans and normed quotas, the growth of labor productivity, reduced labor intensiveness, improved quality of the product and work, the saving of material resources, improving equipment utilization, reducing working time losses) and social (increasing the share of creative elements in labor, the higher general educational and vocational-skill level of the workers, participation in production management, reducing personnel turnover and so forth).

Only a solving of the problems in all three areas will make it possible for the brigade form to become a lever of production intensification and its basic organizational element and to disclose the advantages which are historically inherent to collective labor.

Against the Extensive Approach

One cannot help but see certain undesirable trends which have caused fear for the fate of the brigade forms of labor. Statistics shows that up to now in many sectors the crux of the problem is seen in the extensive spread of brigade forms and in covering a predominant number of the workers with these. At the start of 1982, as a whole for industry brigades brought together 52.5 percent of the workers, including 59 percent in the basic shops. For the individual ministries the corresponding data reached 79 percent. According to the 1983 results, these indicators are even higher.

Hence, the strong enticement to say that we have already met the demand of making the brigade organization of labor the basic form or close to this. But could such an assertion be allowed without an analysis of the brigade's real role in production intensification? In any event the actual picture is significantly more complicated and contradictory than might seem on the basis of some final figures.

First of all, for many indicators in a sector and at enterprises one can clearly see great fluctuations around the average values. For example, in Leningrad

machine building and metalworking, the average percentage of the "coverage" of the workers is 60.5 percent while the variation of the indicators for individual enterprises is from 1.7 to 99.6 percent. While as an average the annual increase in the number of machine building workers covered by the brigade organization was around 30 percent, many enterprises had a higher rate while the Lenpoligrafmash [Leningrad Printing Machinery] Plant literally set a record, achieving an increase of 261.3 percent (from August 1980 through 31 December 1981).

The question involuntarily arises: on what basis has the "coverage" indicator become dominant in all activities related to introducing the brigade organization? Possibly, it predetermines immediate progressive shifts in the organization of labor. The analysis made by us for the machine building ministries has shown a minuscularly strong relationship (the Spearman's grade correlation coefficients lie within a range of $\pm 0.08-0.13$) between the "coverage" and such important characteristics of brigade development as the number of workers per single schedule order with payment for the end result or those employing the KTU [labor participation coefficients] or operating under the conditions of cost accounting. Moreover, a very weak dependence was disclosed between the indicators which seemingly due to their internal nature should strongly influence one another. The relationship between the number of workers which were members of cost-accounting brigades and the number of workers in brigades with payment for the end result was expressed by a correlation coefficient of 0.02. Even between the spread of work under a unified schedule order and payment for the end result, the relationship was weak (a correlation coefficient of 0.26). This is the direct consequence of the drive for "coverage" which like it or not impels the enterprises to set up imperfect brigades which do not meet either the organizational, economic or social tasks of the brigade organization of labor.

An excessive infatuation with "coverage" not only does not provide the essential results but also gives rise to a number of undesirable consequences. Here are examples. There are enterprises where there are many brigades consisting of just two shift workers! At one plant we saw the chief of the NOT [scientific organization of labor] laboratory persuade the enterprise leadership to issue an order on putting the inspectors of the OTK [technical inspection section] into brigades merely on the grounds that their number was just 3 percent of the number of the industrial personnel and consequently the coverage by brigade forms at the plant would also immediately increase by 3 percent. The question of the advisability or the conditions for forming the brigades was not even discussed. However lamentable it may be, at times brigades have been organized by an order in some shop and only those who issue the order know about them.

For a High Effect

For the effective and economically sound introduction of the brigade organization of labor it is essential to establish what elements of brigade labor will aid most in increasing the effect. Such a study should comprise the main area in the program of practical aid to the production collectives by the scientists. Research on the designated dependences in procedural terms should come down to establishing the role of the various factors in increasing the effect indicators. In endeavoring to answer the question of in what way and under what conditions

the brigade forms are more effective than an individual organization, we conducted special research at the Kirovskiy Zavod Production Association [PO] and at a number of other Leningrad enterprises.

A comparison of individual and brigade organizations of labor (all types of brigades were represented) at the same moment and in the same shops of tractor production at Kirovskiy Zavod showed: as a whole the brigade organization is unconditionally more efficient than the individual for many indicators. For example, for it the share of workers operating two and more equipment units is twice as high, the share of workers in related specialties is 1.5-fold higher and in the brigades there is a more responsible attitude toward product quality. In truth, at the same time here with a higher average wage there was a noticeably lower average percentage of fulfilling the output standards. This negative phenomenon was accompanied by a simultaneous decline in the proportional amount of workers who do not fulfill the standards as well as substantially overfulfilling them.

As a whole, the brigades had better social indicators with a somewhat higher degree of satisfaction with labor and a significantly larger share of workers who had honorary titles for high labor efficiency and successes in the socialist competition as well as workers who fulfilled all the operations assigned to the brigade.

Against this background one wonders what has caused the brigade performance which is clearly poorer than among the "individuals": the less high judgment, even by the workers, of possibilities for a further increase in output, a strong inclination to put the responsibility for unsuccessful work on the administration and a tendency of individual groups toward exclusiveness and the opposition of group interests not related to real successes in work to the interests of the enterprise as a whole. Completely opposite in purpose are the views of the brigade organization which can be heard from the organizers of labor at various enterprises: from categorical assertions that they cannot conceive of production without brigades to an outright fear of the brigades as supposedly disrupting the "normal" management of the enterprise.

Thus, although the brigade organization as a whole is undoubtedly more progressive than the individual one, under certain conditions it may not bring substantial successes and even contribute to an obvious decline in the already existing achievements.

However, it is obvious that the shortcomings stem not from the inner nature of the brigade form but rather from a certain imperfection of its organizational mechanism caused by such flaws in the management system as a lack of a clear system of goals, the necessary organizational forms, incentives, appropriate training, indoctrination and so forth.

The chief merit of the brigades is not that they always and under any circumstances provide higher results but rather that they have a substantially higher potential of development than does the individual organization, a higher capacity for improvement and a stronger incentive effect on various aspects of production organization. Precisely this is the fundamental basis of the brigade organization of labor.

Ongoing Development

The brigade form of the organization of labor has been continuously developing. "In recent years," states the Decree of the CPSU Central Committee "On Further Developing and Improving the Effectiveness of the Brigade Form of the Organization and Encouraging of Labor in Industry," "there has been the development of new types of brigades including the integrated and comprehensive and those operating under a single-schedule order with payment for the end result. In them labor productivity grows faster, working time losses are reduced, material and labor resources are spent more economically and possibilities are opened up for a further improvement in organizational and political indoctrinational work, for strengthening discipline, for establishing a spirit of true collectivism, reciprocal exactingness and comradely mutual aid."

The brigade form cannot be viewed as something fixed and ossified. Arising in the form of a comparatively simple, at times even purely formal association of persons, it later under certain conditions was capable of moving on to more complicated, mature stages. The development process is the accumulating and changing of specific properties in the primary labor collective in which there is an ever-stronger relationship between the interests of the individual and the group, mutual aid, a common material and moral interest and responsibility for the necessary results as well as methods of self-management and self-organization which correspond to these tasks.

In addition to the existing classification, it is important to divide brigades according to the level of their socioeconomic maturity. Even now there is a clear demarcation in the dependence between the degree of maturity and the socioeconomic results of the brigade activities. During the same period and at the same enterprise, as a rule, brigades of varying degrees of maturity coexist and there is a possible transition from one level to another, both "upwards" as well as "downwards." An important condition for the growth of production efficiency resides in the progressive transition to a higher stage manifested in the accumulation and broadening of collectivist properties, primarily elements of self-management, on the basis of a high organizational and technical level and cost accounting. Let us demonstrate this using actual material.

Over 140 brigades operating approximately under the same organizational and technical conditions were distributed according to four levels of socioeconomic maturity: a low level where such features of a brigade collective had just been spotted as the presence of an order for its organization, the assigning of a work zone and equipment, the embryos of work according to a single-schedule order; the highest level where there were wages according to the end result, a work plan for an extended period for a number of indicators, brigade councils, contracts with the administration, functional services and related brigades and a developed socialist competition; two intermediate stages. A comparison of the economic and social results of brigade activities of the various levels is shown in the table [on the following page].

In line with what has been said, it is essential in planning to replace the "coverage" indicator with others which are more oriented at improving the effectiveness of the brigade organization, in particular, the already employed indicators for the spread of brigades with wages paid according to the end result or

Economic and Social Results of Activities by Different Types of Brigades

Indicators	Types of Brigades by Maturity Level			
	1	2	3	4
Economic				
Fulfillment of production plan, %	103.0	104.7	105.3	106.3
Annual increase in labor productivity, %	1.2	1.4	1.9	1.6
Acceptance of product on first inspection, %	96.0	96.4	97.0	99.0
Entire-day working time losses, man-days as monthly average	2.5	1.9	1.2	1.0
Overtime as an average per worker per month, hours	1.3	1.3	0.8	0.6
Average monthly wages of one worker, rubles	221.	220.	230.	248.
Social				
Number of innovators in brigade as average, persons	0.4	1.5	0.8	2.0
Personnel turnover, %	5.8	4.9	4.5	1.5
Number of instances of absence without leave as average per brigade per month	2.5	2.0	1.9	1.7
Share of brigades in group holding first place in socialist competition, %	9.4	16.7	13.4	38.5
Share of workers involved in activities of social organizations, %	87.2	86.5	91.3	90.4
Average Rank by Results				
For aggregate of economic indicators	3.6	3.3	1.7	1.3
For aggregate of social indicators	3.8	2.4	2.7	1.2

those operating under the conditions of cost accounting. Here also it would be fitting to have a coefficient for the development of the brigade organization of labor weighted for the various types of brigades.

Any indicators, incidentally, should be closely linked to an analysis of effectiveness. A great deal depends upon the quality of filling out and analyzing the report statistical forms for labor. On the basis of these forms, it is possible to establish not only the number of workers in the brigades, but also the coverage of the workers with personal (brigade) production plans and their fulfillment and to calculate the influence of the individual factors on changing labor productivity, expenditures for the brigade organization and its effectiveness for a number of economic indicators.

These are the potential opportunities. However, at many machine building and metalworking enterprises in Leningrad, we encountered a situation where the data

related to the brigade organization were not recorded and a number of indicators were shown without serious factual evidence. The reason is in the insufficient elaboration of plans for organizational and technical measures on the shop and section level. In essence, often there simply are no primary statistics which reflect changes in the organizational structure of collective labor and the corresponding increase in effect. For example, such instances were encountered by the intersectorial coordinating center for the brigade forms for the organization of labor and wages which operates in the city and has carried out a special thorough study at several-score enterprises in various sectors.

The General Plus the Specific

An analysis makes it possible to assert that one of the conditions for high effectiveness in the brigade organization of labor resides in considering the specific features of the given enterprise and in observing certain common principles. In fact many enterprises approach the successful employment of brigades by seemingly completely dissimilar paths. At the VAZ [Volga Motor Vehicle Plant] these were established in the plans for the enterprise while at the Kaluga Turbine Plant they were introduced in long existing production methods. The Leningrad Shipbuilding Yard imeni A. A. Zhdanov borrowed the experience of contract brigades in construction, having adapted this to the ship assembly processes.

But with all the differences reflecting in essence the universal possibilities and flexibility of the brigade organization, the main thing is primarily in observing the principle of comprehensiveness. Life has completely shown the unsuitability of the still encountered practice of the local introduction of individual brigades. We can scarcely agree with a number of well regarded scientists and production organizations who have propagandized the idea of establishing "beacon brigades," assuming that the advantages of such brigades will be so apparent that subsequently constantly new brigades of a progressive type will appear spontaneously. Reliance on such a path of development is counting sooner on the natural flow of things than on insistent preparatory and organizational work.

What ordinarily happens when there is the local introduction of brigades at a section or shop. On the one hand, as a rule, the brigade organized from the best workers shows excellent examples of labor with productivity, discipline, quality and other indicators being the best at the section or in the shop. The wages for workers which have joined the brigade will grow and satisfaction with the job will rise. But if one considers the place of the brigade in the production process and traces its influence on the section as a whole, then the state of affairs is far from the desired. The local successes of the "beacons" do not advance the entire section since the indicators for production activities remain as before in the operations performed individually due to the desire for "advantageous" pieces, because of absences without leave, stoppages and so forth.

Ultimately, the work of the "beacon brigades" inevitably declines due to the nondelivery of a complete set of parts, and due to inferior products produced in operations outside the brigade. Often sections and shops completely covered

by brigades have not improved their indicators until more dependable forms of ties were established with the services supporting the production process.

Those enterprises which see the sense of the work in a comprehensive, albeit gradual or staged reorganization of all production are on the right path. The scope of "brigadization" must be measured not by the percentages of formal coverage but rather by the degree of the complete conversion of the shops and sections to brigade methods. Today the beacons should be not the individual brigades but rather entire enterprises who have actually improved the major indicators of their operations by this form.

A Comprehensive Approach

Certainly the comprehensive introduction of the brigade organization of labor requires significantly larger expenditures of intelligence, energy and time than does the purely mechanical setting up of brigades and the appointing of brigade leaders. Above all, there must be a serious organizational plan. In practice few sections and shops are encountered which are completely ready for a brigade organization. In a majority of instances it is essential to adapt the production processes to the brigade organization, in replanning the shops, sections and work areas, in adjusting and straightening out the production routes, in establishing product-complete sections and introducing group processing methods. The section or shop organizational plan should become the sole and compulsory document affirming the right to introduce the brigades.

The organizational plan defines the operational zone, the length of the production chain assigned to the brigade collective and the corresponding size of the brigade. Many psychologists and sociologists in their recommendations have set an optimum size within the limits of from 4-5 to 15-20 persons. At the same time, production and economic practice provides many examples of highly effective collective work by 50-70 persons. The problems of interchangeability and taking over for one another, the planning of work, new forms of wages, cost accounting and self-management are more rationally resolved in large collectives, particularly as this is required by many production parameters. Completely correct is the well-known psychologist and academician of the USSR Academy of Medical Sciences, A. V. Petrovskiy, who has concluded that the size of a group by itself is not of crucial significance for group activity. At the same time, many authors assume great responsibility in ascertaining the optimality of certain quantitative characteristics of groups generally, and setting significant guidelines for practice.¹ Consequently, the importance and particular features in the economic and social goals of production activity, the particular features of the production method, the composition of the workers, the degree of the socioeconomic maturity in the collectives and the development level of the management system make it possible to define the rational size of a brigade in very broad limits.

¹ See A. V. Petrovskiy, "Lichnost'. Deyatel'nost'. Kollektiv" [The Individual. Activity. The Collective], Moscow, 1982, pp 71-72.

The successful planning of the brigade organization of labor requires skilled specialists. At present, in a majority of instances this work is entrusted to the NOT laboratories and sections which do have a good deal of experience in the designing of work areas, sections and shops. But the efforts of a single service with a limited staff are not sufficient, all the more if the problem is perceived not as a narrow organizational one but rather as a comprehensive coordinating of technical, economic, social and psychological aspects of human activity. The scope and importance of the problem require universal attention and involvement of all the enterprise workers in carrying out the set task.

The introduction system is well known from the experience of the leading enterprises. First of all, a general plant commission is organized from the representatives of all the services including production engineers, designers, sociologists, economists and NOT workers. The functions of the commission include: determining the objects and scope of introduction, providing procedural materials and working out organizational schemes and plans for introduction. Then internal shop commissions are set up and these are concerned with the brigade organization directly in the given shop.

The Reinforcing of Efforts

Unfortunately, at many enterprises this plan has remained "on paper." The main reason, in our view, has been in the incorrect organization of incentives. In possessing significant material incentive funds, including a one-shot fund for carrying out particularly important assignments, the enterprises have not learned to maneuver these efficiently. At a majority of enterprises the incentive systems for production engineers, sociologists, NOT workers, economists and employees from other services are completely lacking. Our research has established that less than 10 percent of the line leaders (the chiefs of the shops and the foremen) receive additional material incentives for the introduction of brigades.

Special bonus positions are required which would be in effect during the planned period. In the initial stage of introduction, bonuses would go for the maximum incorporation of progressive elements of collective labor and for the comprehensive coverage of the shops, sections and production lines with the brigade organization. Where the brigade forms had taken root and passed the first stage of development, the bonus goals would differ, that is, they would encourage the achieving of high end results from the activities of the sections and shops.

It would be a good thing to strengthen the enterprises with consultation and supervisory aid from highly competent specialized organizations. Of course, these organizations should be exceptionally efficient. The sectorial principle of their formation is not suitable everywhere. More realistic would be a territorial approach to their organization. For example, within the mentioned Leningrad Intersectorial Coordinating Center there is at work a number of sectorial groups (for industry, transportation, communications and construction). In truth, work on volunteer principles does not ensure their extended activity. For this reason it would be advisable to set up research and introduction organizations from the regular co-workers under major VUZes or scientific research institutes and supported by deductions from the enterprises. The forms for the intersectorial centers for the brigade organization of labor could be different.

For example, the Moldavian Goskomtrud [State Committee for Labor and Social Problems] has proposed providing aid to the Moldavian enterprises in working out collective forms of labor through the republic Intersectorial NOT Center.² According to the Decree of the USSR Council of Ministers and the AUCCTU, an inter-departmental center for brigade forms has been organized. We are hopeful that it will assume the coordinating of such centers.

On Planning Principles

The development of the brigade organization of labor raises immediate tasks in the area of improving planning. In speaking with enterprise leaders and in questioning brigade leaders, foremen, engineers and technicians and in conducting studies in the brigade leader schools, we have endeavored to ascertain the readiness of the workers to solve the problem of actually releasing workers in the brigades. The conclusion was that even now the brigade members have agreed to work with smaller numbers under the current conditions of redistributing all or a portion of the wages of the persons released. But they wanted their more productive labor to keep a higher assessment not for a short period of time but for an extended period. The shop engineers and technicians raised even stronger demands. They were afraid that the actual dismissal in the short term would turn against them when the increased production volume had to be carried out by a smaller number of workers while the wage fund reduced considering the smaller number will not make it possible for them to sufficiently encourage the workers. In practice, any norms which were to be introduced were not accepted as stable ones for the entire five-year plan. For this reason, the production workers do not want to pay for the mistakes of the planning bodies and prefer not to take a risk, in consciously concealing reserves. Thus, changes in the system of relationships between the enterprises and the departments as well as guarantees are indispensable.

Unfortunately, the aspect of five-year planning of the brigades as yet has not been examined seriously although it is obvious that short-term guidelines for activities (not more than year-long ones) presently do not encourage the disclosure of major reserves, primarily labor ones. The brigades should be given 5-year, annual and operational plans. Just like sections, shops, production lines and enterprises.

The incentive norms and the restriction norms should be a constant feature in all stages of planning in the brigades. Regardless of the volume and product range changes in individual periods, these will guarantee a socially effective measure of distribution and remuneration in accord with the end results of the work recognized by society.

Thus, the introduction of the brigade organization of labor as the basic form requires not a superficial drive for a percentage coverage of the workers but rather a profound, consistent and rather complex reorganization of many aspects in the organization of production, labor and management on all levels--from the primary collective to the sectorial management bodies.

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² See SOTSIALISTICHESKIY TRUD, No 2, 1982, p 73.

LABOR SPECIALIST INTERVIEWED ON PROBLEMS IN BRIGADES

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 67-71

[Interview with Candidate of Economic Sciences I. S. Kirillov, director of the Western Siberian Affiliate of the Scientific Research Institute for Labor (Novosibirsk) by Candidate of Technical Sciences R. P. Povileyko, Novosibirsk: "Why Have Workers Complained?"; date of the interview is not given]

[Text] [Answer] Some 42 finishers from the Novosibirsk Furniture Factory No 2 sent off a letter to the editors of the oblast newspaper SOVETSKAYA SIBIR' stating that they were against joining a brigade. "All the same, you will work in a brigade," repeated the shop chief. "That is the word."

The shop chief was wrong as this is not the word. The Decree of the CPSU Central Committee "On Further Developing and Increasing the Effectiveness of the Brigade Form of Organizing and Encouraging Labor in Industry" emphasized that one of the areas for improving work efficiency at the enterprises, for broadly involving the workers in production management and indoctrination is the brigade form of the organization and encouraging of labor. The main task has been, is and remains the greatest possible rise in labor productivity and improved work quality. The brigades are an important form of organizing labor which in observing the conditions of cost accounting and others can actually influence the growth of labor productivity. What is essential is not the form but rather the essence, the reporting of not the number of brigades formally organized by order but rather the results of the labor of these brigades. And when the enterprise leaders with disappointment show us fractions of a percent in the increase in labor productivity as a result of introducing the brigade form, we are dealing with "paper brigades." True cost accounting brigades even during the first year or two of their existence have increased labor productivity by 30-40 percent.

[Question] Ivan Semenovich [Kirillov], what would you say specifically about the brigade of finishers from the Furniture Factory No 2 who sent the complaint?

[Answer] We have visited the finishing section of Furniture Shop No 2 and checked the conditions for organizing the brigade. In June 1982, a start-to-finish (two-shift) comprehensive brigade of 25 men was organized. The teams work according to the production chain. The organizing of the brigade coincided

with the appointing of a new chief to the shop and he had the corresponding experience at Furniture Factories No 1 and No 3.

[Question] What mistakes were made?

[Answer] First of all, the enterprise has no regulations governing a production brigade, a brigade contract, a brigade leader, a brigade council or the relationships between the brigade leader and the shop administration. There is only a standard regulation on wages employing a labor participation coefficient. This has the most general nature and is in no way linked to the production features at the finishing section. The converting of the section to operating under the brigade method was carried out hurriedly, without the corresponding preparation and no agreement was obtained from the workers to work on one schedule order. For June 1982 there are no records of the worker meetings for converting to the brigade form of organizing labor while the minutes for March note the arguments of the workers against it.

[Question] Is there a brigade contract?

[Answer] Although the shop leadership feels that a brigade contract is in effect in the finishing section, in fact this is not the case. The collective wages and material incentives are lacking and the coefficient for labor participation is not an internal brigade indicator. The shop administration has not concluded any contract with the brigade. The elaborated form of a monthly plan does not envisage the obtaining of the brigade leader's agreement for the established indicators and the brigade leader is not always provided with a monthly plan quota.

[Question] What would you say about wages in the brigade?

[Answer] This is very important. The slightest oversight, the slightest mistake and the brigade form becomes a formality and in essence only the name of a brigade remains. We must talk not about any oversights or mistakes but rather the actual lack of an economic foundation. Judge for yourself. From an analysis of the labor and wage indicators for the Finisher brigade for December 1982, it is apparent that the amount of work performed would be calculated for 43 persons considering that each person would fulfill the quota by 150 percent. In fact, the brigade had 25 persons and in order to carry out the plan quota and receive a bonus, each person had to fulfill the quota by more than double. This was impossible. Possibly as the plan quotas for the brigade did not give the amount of the bonus for fulfilling the established labor indicators by the brigade.

An analysis was run on the wages of a portion of the workers. It turned out that as an average over the 6 months prior to organizing the brigade, these were 25.5 percent higher than over the same period of brigade work. The wages declined basically due to the smaller amount of extra work, of payments up to the average level and bonuses for fulfilling the plan quotas.

[Question] What are the work results of the brigade?

[Answer] The dividing of jobs into "advantageous" and "disadvantageous" has not been eliminated, there still is the individual accounting of labor and bonuses

while the workers and brigade leader do not know the operating mechanism for the coefficient of labor participation. Naturally, such an organization of the brigade cannot in any noticeable way improve the shop's production activities. In actuality, the annual plan in 1982 was fulfilled by 87.7 percent.

[Question] The ministries and departments have issued plans to all the Novosibirsk enterprises to organize brigades. What about these?

[Answer] The entire question is how the plan is carried out: by orders and paper pro-forma answers or by the establishing of real, highly productive brigades. According to our data, the leaders of the enterprises and shops are confronted with enormous difficulties on the path to carrying out the instructions of the superior bodies. In the first place, the highly skilled workers do not want to join the "middlemen" and particularly the completely "green" youth. Secondly, the problem has arisen of recruiting and training the brigade leaders as out of every five, at least four do not feel themselves fit for this job and abandon it at the first opportunity. Turnover among the brigade leaders is sometimes higher than in their brigades. Thirdly, the relationships of the brigade leaders with the foremen are not clear nor is the allocation of functions and duties between them, particularly as concerns material and administrative liability. For example, who is to answer for safety procedures? Finally, the allocation of earnings between the brigade members must be clear, just and undisputed. All these problems arise in one way or another every time a brigade is established. But if they are not thought out ahead of time, if the prerequisites for resolving them are not established, then the cause of the brigade organization can suffer.

[Question] What distinguishes the present upsurge in the brigade forms of the organization of labor.

[Answer] At present, not ditch diggers with shovels and not masons with trowels, as was the case 50 years ago, are being organized in brigades but rather the working class which possesses high skills and self-awareness and has mastered highly productive equipment. Only the conditions are new while the mistakes are old and there are the same difficulties. In Novosibirsk Oblast, only 12 percent of the brigades are operating on cost accounting. This was according to the reports but a check showed that the figures are much smaller. There are no brigade leaders in one-half of the brigades. The most effective form of brigade cost accounting is the combining of this with the contractual principles of organizing and encouraging labor. The contract has been combined with an improvement in the production and organizational working conditions for the workers and engineers. According to a proposal of the Novosibirsk party obkom, the USSR Goskomtrud [State Committee for Labor and Social Problems] together with the Siberian Division of the USSR Academy of Sciences and other involved ministries has completed the preparations for an experiment of employing new forms of a collective contract at 16 Novosibirsk enterprises. Involved in this experiment being conducted are 7 shops with 37 sections, since 1 January 1984 and designed to run 2 years, are more than 4,000 workers, including around 400 engineers and technicians. The aim of the experiment is to discover the best prerequisites for employing the contract in the associations and enterprises as well as the economic, social and psychological consequences from such a form of organizing wages.

[Question] Are there examples of brigades which could serve as a model for the brigade movement in the oblast?

[Answer] In 1969-1982, one of the production sections at the Novosibirsk Elektrosignal [Electric Signal] Plant, where labor has been collectively organized, showed the following results: the production volume rose by 5.6-fold, labor productivity by 3.3-fold and wages by almost 2.5-fold. The rates speak for themselves.

The brigade was organized on the basis of a section and included all the workers. It included not only the auxiliary workers but also, very interestingly, the engineers, too. Prior to the conversion to the new labor method, the section in just 4 months of 1970 had allowed a lag of 82 days behind the planned output of day-sets. After converting to the new work methods, the section has operated steadily for all 13 years and has not had a single instance of the nonfulfillment of monthly plans. With a planned size of 65 persons, 54 are actually employed. Personnel turnover is 2 percent. Working time losses due to infractions of labor discipline are 1.6 man-days per 100 workers. The discipline problem has virtually been eliminated in the section. The average monthly earnings of the foremen are 340 rubles and for production engineers 294 rubles.

Incidentally, the journal has already written about the work of the section for small series of the frame-stamping shop No 32 at the Novosibirsk Elektrosignal Plant.¹ I would merely add that by 1984, 27 production brigade sections were operating under the new method at the plant with a total of 815 persons, including 55 engineers and technicians. All 27 sections operate steadily, they are highly productive and produce good quality. Complete voluntariness in organizing the brigade, independence in management, complete justness and satisfaction in distributing earnings can be found here. Even considering what has been done, there are many reserves. According to our estimates, the designated brigade is capable of increasing its labor productivity by another 2-3-fold due to the better organization of labor.

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¹ EKO, No 10, 1981.

BRIGADE RESPONSIBILITY FOR PRODUCT QUALITY URGED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 71-73

[Article by E. S. Yarin, engineer at the Altay Tractor Plant Production Association imeni M. I. Kalinin in Rubtsovsk: "The Brigade Bypasses the Technical Inspection Section"]

[Text] At our association bonuses for quality were paid previously on the basis of the individual assessment of the work done by each worker using a point system. Such a procedure did not conform to the brigade organization of labor and was changed. Today the OTK [technical inspection section] on the basis of daily observations determines the number of points for each brigade worker for the month and then calculates the average monthly points for the brigade. Proceeding from this the brigade is given a bonus for quality and this is incorporated in the brigade earnings and distributed under the KTU [labor participation coefficient]. It is envisaged that the KTU can be increased for actively carrying out reciprocal quality control with a high level of performing the work at one's work area and reduced for shoddy workmanship, for violation of technical discipline and other errors on the job.

In small sized brigades, where everything is in view, the labor contribution of each considering the quality is not hard to assess objectively and conflicts over this question are excluded. In large brigades the best results are obtained where the brigade leader sets not only the quantitative indicators but also the qualitative ones for the results of each shift.

The establishing of collective responsibility and a material incentive has strengthened production discipline. The brigades have begun to pay more attention to reciprocal control and to increasing the skills of less experienced workers and to have a more active influence on shirkers. The average annual quality points for 1982 for the association was 4.74 with a maximum of 5.0. There were different levels for the shop: from 4.9 to 4.46 and even 4.02. The fact that individual brigades achieve the maximum number shows the presence of major reserves for improving quality.

We see the path to the fuller utilization of the potential for improving quality primarily in introducing self-control or self-inspection. The quality of executing the work and all the requirements of the production methods and blueprints in a majority of instances can be more carefully inspected by the

executors themselves than by the inspectors from the OTK. An exception is those operations and articles the checking of which require special instruments and devices which are not found at the work area.

Self-inspection has been and is employed with the individual organization of labor. Workers who have demonstrated high examples of self-discipline and who manufactured products corresponding to all the requirements of the standards are given the right to pass it under their own personal stamp, without submission to the OTK. In the association, such a right has been extended to more than 200 workers who have justified the confidence shown. However, under the conditions of the brigade organization, the presence of individual workers who have a personal stamp cannot guarantee the high quality of the collectively produced product. For this reason there is little saving from the individual work of self-inspection. But there is the different question of the passing of products with a brigade quality stamp without submitting this to the OTK inspectors.

In the association's standard which determines the organizational procedures, the rights and duties of the brigades operating on self-inspection, it has been established that the brigade itself inspects the manufactured product for meeting the requirements of the blueprints, technical conditions and the production process. These duties are assigned to each brigade member. The brigade leaders working on self-inspection are paid a bonus amounting to 10 percent of the earnings. This additional bonus is distributed considering the labor participation coefficients.

At the association 11 brigades have been working on self-inspection for 2 years. They have all shown high efficiency and there has not been a single instance of the sections delivering flawed or damaged articles for assembly. The experience of their work has been generalized and drawn up in a standard. Now the task has been set of disseminating this and significantly increasing the number of brigades working on self-inspection. There are the prerequisites for this. As practice has shown, it is significantly easier to convert the brigades to self-inspection if there is at least one or two workers with the right to employ a personal stamp. But there are also impediments.

In the first place, for years many leaders have had the notion that high quality can be provided only by strengthening control from above and the role and opportunities of the labor collectives themselves in carrying out this task have been underestimated. Secondly, the rights and obligations of brigades operating on self-inspection were not previously provided for in the recommendations of the Goskomtrud [State Committee for Labor and Social Problems] for the brigade forms of organizing labor and wages.

Losses from shoddy workmanship in 1982 were 0.37 percent of the total gross expenditures in the association and were reduced by 2-fold in comparison with 1971. For this indicator the association is among the best related enterprises. Complaints have been reduced to 0.48 percent and this is 2.7-fold less than in 1971 and these have basically been about the engines produced by the Altay engine builders. Over the last several years, there has not been a single complaint received about the quality of export products.

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WAGE, BONUS PROVISIONS FOR PLANT TRANSPORT WORKERS EXAMINED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 74-75

[Article by L. K. Udal'tsov and A. Yu. Kirilin from Feodosiya: "A Brigade in Internal Plant Transport"]

[Text] In 1979, our enterprise organized the centralized intershop transporting of freight by battery-operated plant trucks using a tag system. Soon a number of shortcomings appeared impeding the effective use of transport and the efficient supply of production with materials, semifinished products and pieces. The basic ones were the poor quality of repairs and maintenance of the equipment, the poor charging of the storage batteries and so forth.

For normalizing operations, a brigade of the battery-operated plant truck section was established. This included both drivers with individual wages according to the tag system as well as repairmen and battery handlers with an indirect piece wage. The brigade was headed by a leading worker from the drivers.

The piece-bonus wage for the drivers increased their material self-interest, as for each completed trip the driver received a tag. Tags are employed for a trip lasting 20 minutes between distant shops and 10 minutes between close shops and sections. The total number of tags by value corresponds to the wage of the drivers.

Direct control of the drivers is provided by the dispatcher of the centralized intershop freight shipments (TsMP) from the warehouse shop.

The work of the repairmen and battery handlers is paid for out of the total wages of the brigade drivers according to the tags over a month through a conversion factor of 0.35 depending upon the number of actually working auxiliary workers. For the repairmen and battery handlers, the following amounts of bonuses have been set: 20 percent for the prompt dispatching to the line in good working order of at least 12 battery-operated plant trucks; 15 percent for 10 to 12 trucks; 0 percent for less than 8 trucks.

The use of the indirect wage for the auxiliary workers has increased their material incentive. For the drivers a bonus has been set amounting to 20 percent, including 10 percent for fulfilling the shift quotas for transporting the

freight and for carrying out the instructions of the TsMP dispatcher and 10 percent for the absence of stoppages and breakdowns of the transport due to their fault and the observance of the truck operating rules.

The distribution of earnings for the transporting of the freight and indirect wages is carried out using the brigade calculation table. The earnings are distributed between the repairmen and the battery handlers using the brigade table and considering the actually worked time and the rate coefficient.

The not full-time brigade leader receives the wages as a driver and for leading the brigade he is given an additional payment for the fulfillment of the monthly shipping plan in the following amounts: 10 percent of his salary if an average of from 8 to 10 drivers are working on the line and 15 percent with over 10 drivers. If a driver repairs a plant truck, then his labor is paid for out of the total indirect wage of the auxiliary workers while the actually worked time is paid from the calculation of the wage coefficient of his category for the indirect wage.

If in calculating the wages for the auxiliary workers their total is less than the scale (because of the absence of plant cart drivers), they are given an additional payment up to the rate if at least 12 plant cars are in proper working order.

The changeover to the collective form of organizing the labor of the drivers, the repairmen and the battery handlers has ensured the fulfillment of the quotas for the intershop freight shipments, the daily ready operation of an average of 13 plant trucks (which was never achieved previously) and the high-quality repair and servicing of the machines during the workday. Responsibility was also increased for the state of production and labor discipline.

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DELINEATION OF DUTIES OF FOREMAN, BRIGADE LEADER EXAMINED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 76-80

[Article by V. G. Usmanov, deputy chief of the Section for the Scientific Organization of Labor and Management at the Urals Elektrotiyazhmash (Urals Heavy Electrical Machinery) Association in Sverdlovsk: "The Foreman and the Brigade Leader"]

[Text] With the turning of the brigade into the basic form of organizing labor, inevitably the functions, rights and responsibilities are divided between the leaders of the middle and lower-level of management, the foreman and the brigade leader. In this regard, I would like to share the experience of our association.

The comparative study made by us of plant regulations governing the production brigade has shown that of the 18 functions entrusted to the foreman, 13 of them completely or partially coincide with the duties of the brigade leader. Among these are: effective leadership of the workers (placement in work areas, the issuing of an assignment and so forth); control over the observance of production discipline and product quality; the introduction of progressive forms of the organization of labor (the combining of professions, multiple-machine operation and so forth) and the effective use of fixed productive capital; the introduction of advanced experience; increasing the skills and strengthening labor discipline; the development of creative activeness and indoctrination of the workers.

At the same time, a number of functions have been given to only the foreman: the introduction of new equipment and advanced production methods; ensuring the safekeeping of equipment and other valuable materials; the readying of production for fulfilling the section production quota; drawing up the payment and operating documents; observing the safety and industrial sanitation rules.

First of all, let us isolate those functions which could be turned over to the brigade leader. As a rule, these are direct leadership of the brigade, the dissemination of advanced experience and supervision over the observance of production discipline. For other functions to be partially turned over to the brigade leader, let us clearly define the limits of separation. And in each specific instance the limitations can be technical, organizational or social factors such as: the complexity of the production processes, the demands on

product quality, the level of skills and vocational training of the brigade members, professional qualities, the authority of the brigade leader and so forth.

The carrying out of such work also disclosed common limits for the rational dividing of functions for all instances: the readiness of the foreman to make the division or separation where he could be released from a substantial part of his executive functions related to direct leadership with the simultaneous strengthening of work over the long run, with an increased level of preventive planning decisions and a more complete fulfillment of the functions remaining to him.

The level of division was also influenced by the ability of the brigade collective and primarily its leader, the brigadier, to assume responsibility for carrying out the delegated functions and ensuring their fulfillment. Since the regulation governing the production foreman was not altered with the appearance of the new management element, the foreman even with the presence of brigades bears full responsibility for the work results of the section. At the same time the brigade leader as before remains a worker and bears predominantly a moral responsibility for the work results of the primary labor collective (although material responsibility, of course, is not excluded). For this reason the breadth of delegating functions to the brigade leader depends primarily upon the level of confidence.

The magnet-assembly section in the dry transformer shop can serve as an example of the dividing of management functions for the brigade considering the above-given notions. In uniting all the workers of the section into a single brigade, one foreman was released while the remaining senior foreman completely turned over all the functions of operational management to the brigade leader, keeping for himself basically the preparation of production, operational planning, contact with the shift services for supplying the daily shift quota and a number of long-range questions. The brigade was given a monthly production quota for the product range in norm-hours and in indicators of end product. In accord with this quota, wages and bonuses are paid to the collective. In the brigade, they do not remember an instance when the senior foreman took over for the brigade leader or brigade council, intervened into their competence or limited worker initiative. Precisely such relations made it possible to avoid conflict and contributed to the development of creativity among the brigade members. Over the 2 years of the 11th Five-Year Plan, 27 workers increased their labor productivity by 43 percent by combining professions, broadening the operating zones and condensing the workday.

The allocating of functions between the foreman and the brigade leader could not be carried out by a single order or instruction but rather was improved gradually as both parties were prepared. Here it is essential to take measures without fail to accelerate such preparation by training the leaders. This must not be overlooked for otherwise serious miscalculations are inevitable. Thus, in the shop for high voltage oil switches, as an experiment, a brigade of assemblers was trusted to carry out accounting without a time sheet for the time worked in the aim of optimizing the worker load factor within the shift and weekly time funds. However, the brigade was unprepared, instances of the abuse of confidence were disclosed and the right was canceled for accounting without a time sheet.

The unclear allocating of functions, rights and responsibility leads to conflict situations. A study of the conflicts has shown that most often the pretext for them is the following: the setting of the sequence for manufacturing parts (carrying out work) within the shift quota; assigning production quotas to brigade members and assigning them to work areas; the distributing of common-brigade earnings; diverting to side jobs without changing the indicators of the brigade's activities; changing the size of the brigade without its approval.

Most often the conflict was based on the reticence of the foreman to grant the brigade leader certain independence in operational management of production. Often such a reticence was founded on an inability to free oneself from routine questions and refocus on the long run. The problem of allocating functions confronts the foreman most acutely in the instance when all the workers of a section are brought together in a single brigade.

An incorrect understanding of the problem of the relationships of the foreman and the brigade leader as well as a desire to use the brigade form of organizing labor to avoid solving urgent problems often lead to all sorts of distortions and violations and ultimately do harm to the brigade movement. One such distortion, in my opinion, is to combine the position of foreman and brigade leader. Unfortunately, in the press such a combining at times is viewed positively. But let us try to see what happens here. The foreman-brigade leader is under dual subordination: on the one hand, there is the immediate line leader and on the other the council and general meeting of the brigade (the decisions of which are compulsory for the brigade leader). Thus, the combining of the position of brigade leader by the foreman harms the idea of brigade self-administration, turning it into a formal one. Certainly the brigade leader is a foreman! But what happens in the event that the brigade rejects the candidacy of the brigade leader? And here we are disregarding the fact that many current instructions and regulations are violated in paying the foreman-brigade leader extra out of the general brigade earnings.

For example, what should one do with the restriction on the amount of bonuses set for engineers, technicians and leading workers? Nor is the situation any better considering the expenditure of the wage fund and the incentive funds for worker categories. The situation, as we see, is completely snarled, although this combining of jobs, as a rule, is based on a desire for the foreman to increase his wages so that he will be more interested in the work results of the brigade. We feel that not all means are good for reducing the gap in the earnings of the workers and the foremen and for encouraging the latter to more efficiently perform their duties. The Decree of the USSR Council of Ministers and the AUCCTU "On Measures for Further Developing and Increasing the Effectiveness of the Brigade Form of Organizing and Encouraging Labor in Industry" has outlined the appropriate measures and these must be followed.

Another extreme in the development of the brigade organization has been the excessive enlarging of the brigades up to 50-100 persons and even more. In this instance the administration is trying to impose a maximum number of questions on the brigade and at times to shift certain of its duties to the brigade. Then the brigade leader spends a significant portion of the time on leading the brigade. Hence, the frequent instances of introducing the position of the "full-time" brigade leader (most often converting him to a time wage or salary) or the already known combining of the positions of foreman and brigade leader.

Similar cases have been encountered in our practice. The administration of the assembly shop for high-voltage switches proposed that four assembler brigades be combined into one bringing its size up to 50 workers. A detailed study showed that the reason for such a decision was the inexperience and insufficient knowledge of production on the part of the senior foreman. Having decided to unite the brigades, the shop administration intended to put at the head of the new conglomerate an experienced brigade leader with a secondary technical education who in terms of experience, knowledge and professional qualities could successfully direct the section. Simultaneously it requested that the brigade leader be made "full-time, that is, that he be shifted to a salary and here he would be guaranteed the maintaining of his former earnings. But the brigade refused the proposal to shift to the position of senior foreman due to the excessive details of the work, the increased responsibility and the reduced wages.

The experience of our plant makes it possible to draw up recommendations on improving the work of the foreman--brigade leader management levels:

- 1) Considering the specific features of production and the training level of the foreman and the brigade leader it is essential to clearly delimit the functions, rights and responsibilities between them;
- 2) In managing a brigade preference should be given to economic and organizational methods. Planning should become the basic method for managing the brigade, that is, the setting of indicators and evaluating the activities of the brigade collective from these indicators;
- 3) It is essential not to take over for the management bodies of the brigade collective (the brigade leader, the brigade council and the general brigade meeting). It is essential in every possible way to help them establish a healthy psychological climate in the brigade collective in the struggle to achieve the set goals;
- 4) It is essential to avoid violating the normal production pace of the brigade and in the event that this does occur (a change in the volume or range of produced product, the diverting of workers and so forth), methods must be found for compensating the brigade's losses (the brigade's work indicators must be adjusted and additional payment or job rates introduced).

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PROBLEMS, PROGRESS OF DESIGNING COLD-WEATHER EQUIPMENT VIEWED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 81-91

[Article by A. B. Sukhovskiy, V. N. Vil'derman from the Krasnoyarsk Affiliate of the All-Union Scientific Research Institute for Construction and Road Machinery, and Yu. G. Benderskiy, Candidate of Economic Sciences at the Institute for the Economics and Organization of Industrial Production under the Siberian Division of the USSR Academy of Sciences: "Equipment for Siberia and the North"]

[Text] The sharp rise in the development rate of the productive forces in the regions of Siberia, the North and Northeast of the nation have required the mass development of equipment adapted for the conditions of these regions. The experience of operating a large amount of machinery, equipment and construction elements of the usual make in the northern areas has shown the unfavorable influence of the severe climatic conditions on their workability. The number of failures and breakdowns at low temperatures increases by many-fold in comparison with a temperate climate.

In this regard, upon the initiative of the Siberian Division of the USSR Academy of Sciences, a start has been made on working out measures to increase the reliability and durability of the machines, equipment and metal structures destined for operation under low temperature conditions.

In June 1966, under the State Committee of the USSR Council of Ministers for Science and Technology [CKNT], a Scientific Council for the Problem of Developing Machines Operated under Low Temperature Conditions was organized headed by Academician M. A. Lavrent'yev. In 1966, in Krasnoyarsk, the First All-Union Scientific and Technical Conference on the Problems of Developing and Serially Producing Construction and Road Machinery for Operation under the Conditions of the Northern and Northeastern Regions of the USSR was held.

In the past years, extensive work has been done on developing and organizing series output of special performance equipment ("CL" [KhL]) for operation under cold climate conditions. Production was started of clamshell excavators, power and self-propelled cranes, bulldozers, rippers and other equipment. Just during the years of the Tenth Five-Year Plan around 30,000 units of construction and road equipment of over 30 types were produced for northern conditions, 10 models of trucks were developed and 17,500 units of motor transport equipment were produced, including heavy quarry dump trucks and tractor and trailer rigs. Some

15 types of cold-climate machinery and equipment are produced for the ore mining industry including quarry excavators, well drilling rigs and so forth.

However, the scale of the work done has lagged substantially behind national economic requirements. The ways for surmounting the difficulties in supplying the economy of Siberia and the North with effective and reliable equipment, including construction and road machinery, were the subject of a discussion at an all-Union scientific and technical conference held in Krasnoyarsk.

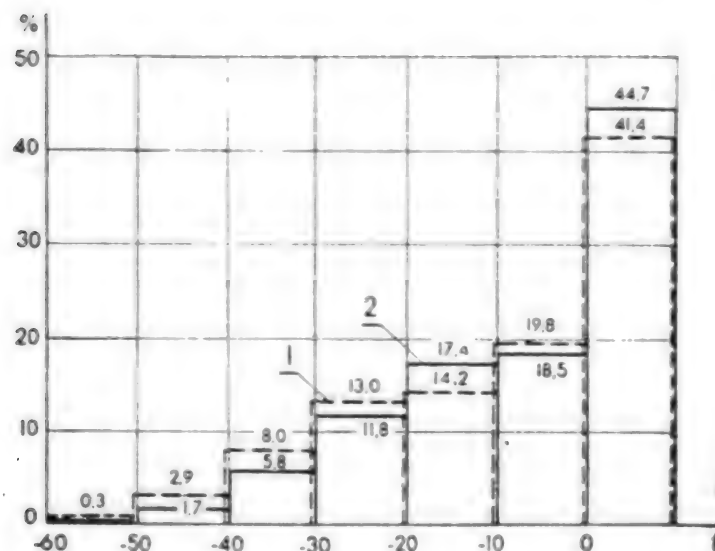
What Equipment is Needed for Siberia and the North?

Undoubtedly, the most effective is that equipment which corresponds to the entire range of operating conditions and includes the mining-geological, natural-climatic, ecological as well as the economic and social particular features of the region. For this reason, it is essential first of all to determine these conditions and not only for the current five-year plan but also for the long run.

The basic document which regulates the natural climatic conditions under which the various types of machinery should operate is the State Standard 15150-69 which was issued as early as 1969. It divided the territory of Siberia and the North into two zones: a cold climate where machinery of the corresponding performance ("CL") should be delivered and a temperate climate for ordinary machines. According to this State Standard, for example, machines of the "CL" make should remain operable at temperatures to -60°C . Such a rigid dividing of the territory of Siberia and the North into two macroclimatic regions was justified for that development level of the equipment and the national economy when the development prospects of the region's economy had not been examined so closely and data had not been acquired on the operation of various types of equipment at low temperatures. The research conducted at the Krasnoyarsk Affiliate of the VNIISstroydormash [All-Union Scientific Research Institute for Construction and Road Machinery] has shown that the distribution by outside air temperatures of construction work which is to be carried out in the regions of Siberia and the North over the long run is as is shown in the diagram [on the following page].

Thus, approximately 97 percent of the volume of construction work is to be done at temperatures over -40°C . From this it follows that the most numerous for Siberia and the North should be ordinary type machines. However, the existing ordinary machines for a number of reasons do not satisfy the operating conditions in the northern regions. They are not sufficiently reliable and durable, they are inconvenient to operate, particularly in the winter period, and so forth. In this regard, it would be best to develop equipment designed for temperatures above the extremal ones and which are most wide-found in those areas of Siberia and the North, where basic work is planned over the long run.

There are two ways for resolving the given question. The first is to harden the technical demands upon the conventional-type machines, to improve their reliability at low temperatures and improve the operating and biotechnological performance. The second is to develop intermediate modifications of machines adapted to northern operating conditions but for less severe ones than envisaged in the State Standard. The choice of the rational path is determined by economic advisability. It is also essential to work out the special technical requirements for these machines.



Distribution of amount of construction work in regions of Siberia and the North planned for completion over the long-range period (up to the year 2000) according to outside air temperatures, %

1--"CL" zone according to State Standard 15150-69;

2--Calculation data

NOTE: In the regions of Siberia and the North are: Krasnoyarsk Kray, the Yakut ASSR, Magadan Oblast, the zone of the BAM [Baykal-Amur Mainline], Khabarovsk Kray, Amur and Chita Oblasts, the Buryat ASSR, Irkutsk, Tyumen, Omsk and Sverdlovsk Oblasts, the Komi ASSR, Arkhangelsk and Murmansk Oblast.

It is essential to point out that such a positing of the question in no way eliminates the acuteness of the problem of developing equipment designed for operation at lower temperatures, all the more as the amount of work which is planned in construction under extreme conditions (at a temperature below -40°C) varies in the different regions of Siberia and the North. The maximum amounts of such work are planned in the Yakut ASSR (up to 11 percent), in Magadan Oblast (7 percent), in the development zone of the BAM (5.6 percent) and in Chita Oblast (4.5 percent). In Krasnoyarsk Kray, Amur Oblast, the Buryat ASSR, Irkutsk and Tyumen Oblasts, the share of such work does not exceed 2-3 percent and in the other Siberian regions is even lower.

The basic factor which impedes the production of cold-weather equipment, in the opinion of representatives from the ministries producing these machines, is the extremely insufficient delivery volume and the poor quality of the preassembled articles and materials for "CL" performance.

Often even the delivered northern-performance machines and preassembled articles do not correspond to the State Standard. The "CL" index often in no way means the actual classifying of the given machine in the northern category. Paradoxically often the reliability of cold-weather equipment is lower than the serially produced machines. The reason is in the numerous breakdowns of the additionally installed special units and equipment. If it is considered that

the special equipment is 1.2-1.4-fold more expensive than ordinary machines, it is not surprising that the managers are more willing to purchase, for example, three ordinary machines instead of two special ones.

The production workers are themselves forced to adapt the ordinary equipment to local operating conditions. This, naturally, is of poorer quality and is significantly more expensive than at the manufacturing plants. Thus, the Norilsk Mining-Metallurgical Combine alone each year spends 1 million rubles on reworking mining equipment and 2.5 million rubles on reequipping motor vehicles and other transport equipment. In the estimates of specialists from the Siberian Division of the USSR Academy of Sciences, the national economic losses from the use in Siberia and the North of equipment not adapted to the operating conditions run to several billion rubles a year.¹

In determining the specifications of equipment for Siberia and the North, it is extremely important to also consider the demands caused by the specific production features and the socioeconomic traits in the region's development. At present, machines for Siberia and the North are developed, as a rule, on the basis of existing models by a certain replacing of design materials, operating fluids and employing special systems and certain measures which improve the working conditions for the drivers. Such a way does not require an essential reorganization of production as in essence the same model is produced only somewhat adapted to northern conditions. But this way does not ensure a predominant rise in production efficiency in the region.

Moreover, the fleet of machines existing in the various sectors does not make it possible to significantly raise labor productivity. Thus, the specific power of construction machines employed in the regions of Siberia and the North is less than the national average, including by 15-20 percent for bulldozers, 8-10 percent for cranes and so forth. The average capacity of Soviet-produced dump trucks operated in Siberia is approximately 1/3 that which is required. The shovel capacity is 1/5 to 1/10 that required for loaders employed in the mining industry of Siberia and the North. There is the acute question of increasing the unit capacity of the bulldozer-ripper equipment and tractors. Thus, in the overall fleet of tractor equipment operated in Siberia and the North, including around 30 percent of all the caterpillar tractors in the nation and 20 percent of the wheeled ones, heavy caterpillar tractors are in particularly short supply and the proportional amount of these, in the estimate of specialists, should be a minimum of 5-fold more than it is at present. The power of the bulldozer and ripper equipment employed in strip mining also should be increased by at least 2.5-fold.

The conference in Krasnoyarsk voiced the unanimous opinion that it is essential to design, develop and serially produce high-powered machines with a high level of reliability and which provide a labor-saving effect that is particularly important in the regions of Siberia and the North. In this regard, it is

¹ A. G. Aganbegyan, "The Effectiveness of Siberia," in the book: "Zadachi stavit Sibir'" [Siberia Poses Problems], Moscow, Sovetskaya Rossiya, 1982, p 52.

essential to forecast the development trend and establish rational parameters of machines for Siberia and the North.

Repairs, Their Organization and Effectiveness

The North requires not only high-powered and reliable equipment but also easy-to-repair. At present, repair facilities have been little developed, the required spare parts are lacking, the access to assemblies and units is difficult during maintenance and repair, and there are significant labor expenditures and high costs of the work of rebuilding the machines and maintaining them in a working state. In a number of instances in operating equipment in regions of Siberia and the North, expenditures on repairs over the service life of the equipment surpass the balance sheet cost of the machines by 3-5-fold. We cannot even raise the question of spare parts and preassembled articles for the "CL" types as even ordinary spare parts are in short supply. This has led to a situation where ordinary spare parts and units are employed for repairing the special-type machines. As a consequence of this, the "CL" machines after several years of operation in essence are turned into ordinary type machines.

One of the reasons for the high cost and labor intensiveness of repairs is the shortage of capacity at the repair facilities and their scattering. According to estimates of specialists, the level of mechanization for repairs in the region does not exceed 8-10 percent. The existing situation is aggravated by the significant proportional amount of physically worn out and obsolete equipment. Thus, in 1980, at the pits of the Krasnoyarskugol' [Krasnoyarsk Coal] Association, the share of trucks with a service life of more than 10 years was over 35 percent.

The problem of equipment repairs under the conditions of Siberia and the North should be solved comprehensively. Here the main areas are improving the operating and repair efficiency of the machines, forming an effective system of maintenance and repairs, including maker maintenance, the organizing of special mobile facilities for maintenance and repair of machines directly on the line and so forth.

Also unresolved are organizational questions related to the development and operation of northern equipment. Here also many reserves are to be found. For example, let us take the consumption of fuels, lubricants and working fluids. For many years, the manufacturing plants have not altered the operating instructions regulating the time of their replacement. At the same time in recent years, the quality of these materials has been significantly improved. But since there are no scientifically-based recommendations on rational systems for changing lubricants, the plant instructions often give different conditions for the same type of machines. As a result, tens of thousands of tons of lubricants and working fluids are lost.

Of interest is the experience of the brigade-flow method for transporting freight and known as the "Arctic Relay." With this method of operation, the motor vehicle is constantly on the move while the drivers are changed at certain points. This excludes vehicle stoppages along the way, the operating of the engine while parked during the winter, it accelerates the delivery of the freight and reduces gasoline consumption. Over the year, the drivers of the

brigade of Yu. P. Mikryukov which used this method saved 15,500 liters of gasoline.

The very system of supplying the consumers with cold-weather equipment also requires improving. A larger portion of the equipment going to the North is delivered during the navigation season, from July through September. Later the supplier enterprises are forced to ship this equipment to regions with a temperate or even warm climate in the aim of fulfilling the sales plan. Such a situation is intolerable.

An essential condition for solving the posed questions is a more complete assessment of the economic effectiveness of developing and using equipment for Siberia and the North. Here two aspects are the most important.

In the first place, considering a broader range of factors which reflect the real expenditures of developing the special equipment, including for scientific research, experimental design and other work as well as the increased expenditures on the reproduction of the labor force in the regions of Siberia and the North. In particular, the presence of increased expenditures not only in the production but also the nonproduction sphere causes a corresponding additional savings from reducing the need for manpower.

Secondly, the stricter setting of effectiveness from replacing the cold-weather equipment with regular machines in the various regions of Siberia and the North. Precisely this aspect, regardless of its seeming simplicity, requires additional study, as scientific and technical progress has led to an overall rise in equipment reliability, evening out, within certain limits, the negative effect of a number of regional factors, including low temperature.

A Systems Approach Settles the Matter

The need to move from the production of individual machines to the development of systems of machines and equipment which ensure full mechanization and automation of the production processes is one of the most important problems. The complicating of economic and production ties further strengthens the importance of a comprehensive approach of developing systems of machines for Siberia and the North, since the strengthening of individual links cannot produce a positive effect due to weaknesses in other links. For example, let us examine the problem of extending the Arctic navigation season. During the heaviest frosts, vessels arrive in the Port of Dudinka escorted by icebreakers but there is nothing to work the ships with as there are neither portal cranes nor loaders which could be operated at temperatures below -40°C . As a result, there are above-norm stoppages.

And for now these are only experimental trips and what can be expected in mastering year-round navigation?

The systems of machines should be worked out for entire production sectors, encompassing not only the basic processes but also the auxiliary ones. We have acquired experience in such an approach. For example, there are plans to develop a system of machines for building the large-diameter pipelines in the regions of Siberia and the North. The system would include earth moving machines

for excavating the trenches, special construction equipment based on cross-country vehicles, highly reliable and powerful pipelayers, new types of transport, units for bending large-diameter pipe and many other types of equipment.

The solving of the listed questions could be accelerated by working out an intersectorial, comprehensive program "The Equipment of Siberia and the North" for the period up to the year 2000 under the aegis of the USSR GKNT. This program would encompass all the questions related to the development, series production, operation, maintenance and repair of machines for Siberia and the North.

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COMPARATIVE METHODS OF STUDYING ENERGY SAVINGS ANALYZED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 91-98

[Article by Engr S. Ye. Rozin, Ya. M. Shchelokov, Candidate of Technical Sciences at the Uralenergochermet (Urals Energy and Ferrous Metallurgy) Technical Production Enterprise, and V. G. Lisiyenko, Doctor of Technical Sciences, Professor at the Urals Polytechnical Institute imeni S. M. Kirov in Sverdlovsk: "A Scientific Basis for Saving Energy"]

[Text] The basic reserves for saving energy are to be found in the production processes in which due to the low energy efficiency of many technologies over 50 percent of the produced fuel and two-thirds of the generated electric power are consumed. The possibilities for saving in energy generation are significantly less than the analogous opportunities in production.

For an analysis of energy consumption in production up to now they have employed an "energy approach" which includes the utilization of energy balances for disclosing energy losses in a separate energy-production unit, the reasons for their appearance and the ways for eliminating them. Such an approach distorts the notion of the true energy expenditures, since energy consumption in production has a number of particular features:

- 1) A multivariance in obtaining a finished product, for example, steel casting which is possible in converters, open hearth or electric-arc furnaces;
- 2) Energy consumption is interdependent in the production stages. For example, reducing the consumption of energy-intensive iron increases fuel consumption in steel casting but reduces the overall consumption of energy resources in the sector;
- 3) The consumption of energy in each process depends upon the limiting production factors in each link of the production chain;
- 4) There is a small proportional amount of energy expenditures in the cost of the product of an individually taken stage and this reduces the repayment of expenditures on saving energy within the stage;
- 5) Production demands on the conditions for utilizing energy frequently run counter to the demands of optimum energy utilization;

6) The greater diversity, in comparison with energy production, in the simultaneously employable energy sources and the stricter demands on their parameters (fuel quality, gas pressure and temperature and so forth);

7) The broader opportunities (than in power production) for improving designs and increasing the efficiency of the energy-production units and the broader range of proportional expenditures of energy resources on the same type of units with the same capacity.

In each production process or separate operation, energy can be consumed in three basic forms:

1) Energy supplied from sources which are external in relation to the given production and is employed directly without conversion (for example, the chemical energy of fossil fuel considering expenditures on mining, transporting, preparation and so forth);

2) The energy from different types of derivative energy sources considering expenditures on conversion (having in mind steam, coke, compressed air and so forth);

3) Energy consumed in previous production systems or individual operations and contained in a concealed form in the initial materials of the given process.

We have proposed a method for evaluating energy expenditures by an across-the-board calculation for the entire production chain. Let us examine this from the example of the basic production chain of metallurgical output with a complete cycle from iron ore mining to the obtaining of merchant bar products (see Table 1), considering the energy expenditures in all the auxiliary shops, both production (the production of coke, refractories, fluxes and ferroalloys) as well as energy ones (production of electric power, oxygen, compressed air and so forth). In the table energy consumption in each operation includes the expenditures of energy in the previous operation (and in the auxiliary chains) with the corresponding expenditure coefficients.

From the data of Table 1 it follows that at the outset of the production chain, right up to the production of iron inclusively, the share of energy consumption in the first and second forms comprises a large portion of the total energy consumption (from 55 to 100 percent and 71 percent in iron production). However, in analyzing energy expenditures in blast furnace casting, ordinarily they do not consider not only the 29 percent concealed energy consumption but also the indirect energy expenditures on heating the blast charge, obtaining electric power, oxygen, water and so forth. Even fewer energy expenditures are considered in drawing up the thermal balance of blast furnace casting.

In obtaining steel using the oxygen converter process and for merchant bar products which are the end product of metallurgical production, the share of concealed energy consumption increases up to 86-94 percent (see Table 1). Here it is possible to obtain significant savings in energy (not to mention labor expenditures) by saving material resources involved in the process.

Table 1

Energy Consumption for Stages in Basic Production Chain
of Metallurgical Production with a Complete Cycle

Production Stages	Forms of Energy Consumption						Total Energy Consumption	
	First		Second		Third			
	a	%	a	%	a	%	a	%
	Iron ore mining	2.3	25.3	6.8	74.7	--	--	9.1
Concentrating of iron ore	12.7	35.1	7.2	19.9	16.3	45.0	36.2	100
Sintering	77.2	64.6	7.6	6.4	34.7	29.0	119.5	100
Iron production	144.0	13.4	721.1	67.1	210.3	19.5	1075.4	100
Oxygen converter steel production	33.0	2.9	38.4	3.4	1053.1	93.7	1124.5	100
Production of merchant bar products	198.0	12.4	73.0	3.8	1632.0	85.8	1903.0	100

Key: a--Kilograms of fuel units per ton.

The metal utilization factor in machine building and metalworking averages 0.72-0.73. For this reason, the energy consumed in the finished machine building products is more than 2,500 kg of fuel units per ton and this exceeds the energy expenditures on machining the metal.

A substantial savings in energy calculated per finished article can be obtained in increasing the ratio of steel casting to iron casting (raising the share of scrap in the charge); by increasing the ratio of rolled products production to steel casting by introducing continuous steel casting, semicontinuous rolling methods, articles with minus tolerances, waste-free production methods and so forth; in introducing technologies which increase the metal use factor in machine building and metalworking and reduce the metal intensiveness of the products. In all these instances one can speak of the material equivalents of energy resources which provide a greater savings of energy than the savings of purely energy resources.

For reducing all forms of energy consumption to single universal indicators, we have proposed using a special term, the production fuel number (PFN [Rus. TTCh]). The PFN is the total expenditures of fuel and other types of energy recalculated in fuel units and necessary for obtaining the energy in the given and all previous stages of the production process minus the fuel, thermal and other secondary energy resources (in kilograms of fuel units per unit of product). The PFN is a full energy description of the production process and an indicator for the energy intensiveness of the end product.

The use of the PFN for analyzing energy expenditures can be examined from the example of steel production using various processes (see Table 2). In comparison for the energy expenditures within the steel casting process (the total of the first two forms of energy), the most energy-intensive are the electric steel casting and scrap-process open hearth, but when viewed for the PFN it turns out that the oxygen converter method is the most energy intensive.

The interdependence and mutual penetration of modern production processes require limits on the number of processes in the designated production chain. In a number of instances it is possible to employ a sectorial principle as ordinarily within a sector there are basic processes of a given production which are carried out and, equally important, the planning of production and expenditures is done along sectorial lines. For this reason, here it is possible to introduce a sectorial PFN. With an across-the-board examination of energy expenditures on producing the end product, within a number of sectors in which virtually all the basic technologies for obtaining it are carried out, it is advisable to also introduce an intersectorial PFN.

The PFN helps disclose the key areas in the production chain within which energy consumption increases sharply and where the basic reserves are found to save it. The employing of the PFN will make it possible to view the national economic plan not only in physical or monetary terms but also in energy terms. This will create additional deeper opportunities for selecting the most economic production methods. Of course, in selecting an optimum production method the questions of the proportional energy intensiveness of the product should be viewed in an unbroken link with the amount of capital expenditures, labor productivity, social factors and so forth.

Table 2

Comparison of Energy Consumption in Casting Steel by Various Processes

Type of Process	Forms of Energy Consumption						PFN [Rus. TTCh]	
	First		Second		Third		a	%
	a	%	a	%	a	%		
Oxygen converter	33.0	2.9	38.4	3.4	1053.1	93.7	1124.5	100
Process in a double-bath steel casting unit	40.0	4.1	30.3	3.1	907.2	92.8	977.5	86.9
Scrap-ore open hearth	134.5	14.6	25.3	2.7	762.0	82.7	921.8	82.0
Scrap-process open hearth	254.3	33.4	31.9	4.2	476.1	62.4	762.3	67.8
Electric casting in an arc furnace	40.0	7.9	243.1	47.7	226.0	44.4	509.1	45.3

Key: a--Kilograms of fuel units per ton.

The optimizing of production methods in terms of energy consumption requires a comprehensive systems approach to the savings in all three forms of energy expenditures in a close interrelationship. Here it is preferable to have a savings in that form of energy consumption where a maximum total effect can be obtained (even if a negative result arises in the remaining forms).

The basic method for analyzing energy intensiveness will be the calculating of the PFN as this includes all the essential factors which influence the use of energy in the production process and in each energy-production unit. In particular, an examination is made of the following: the advisability of modernizing or replacing production methods and raw materials; the degree of organizational and technical support of the process and the possibility of eliminating limiting elements; the conformity of the parameters of the energy sources to the particular features of the units and production methods; the degree of effectiveness and the necessity of improving the units, the energy-converting (burners and so forth) and recovery devices (or units of secondary energy resources); the rationality of the repair system and the employed materials; the equipping and reliability of monitoring and metering equipment and automatic control systems; the rationality of the conditions for consuming energy sources and their conformity to the production method and design of the unit; the state of accounting for the consumption of energy resources, personnel skills and so forth.

In accord with the aims of saving fuel and energy resources in 1981-1985, limits are being set for the enterprises in the consumption of fuel and electric power as well as quotas for the annual reduction in the fuel consumption rate by 2.5 percent and heat by 1.6 percent. The improved method of norming and reporting can become one of the main levers helping to improve energy utilization and, at the same time, the basic method for monitoring energy consumption. The ubiquitously employed norming of each type of energy resources using the accounting-statistical method, proceeding from the achieved results for each production process and for each type of energy resource individually (as has been reinforced in the existing form of reporting) does not encourage a struggle to reduce the expenditures of energy resources and actually permits the existence of a broad range of energy source consumption in the same type of energy-production units.

We feel it is advisable to employ two ways simultaneously. In the first place, the working out and incorporation in the norms and reporting of a comprehensive indicator for the consumption of energy resources for the production method in the form of the PFN (for an individual production line, enterprise, sector and the intersectorial PFN). Secondly, the working out and introduction of base average sector and progressive consumption rates both for the individual types of energy resources as well as a comprehensive indicator (PFN) for interchangeable products.

The introduction of a payment for energy resources and bonuses for their saving provides a greater incentive for the enterprises to establish and fulfill the most progressive standards than does a system for saving energy resources in inflated standards.

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PLANNING OF BETTER SECTOR MANAGEMENT EXAMINED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 99-113

[Article by Candidate of Economic Sciences L. B. Dekel'man from Moscow: "Is the Improving of Sectorial Management Effectively Planned?"]

[Text] At the December (1983) Plenum of the CPSU Central Committee the question was raised of working out a program for comprehensively improving the entire management mechanism. In this regard, let us examine the experience of planning an improvement in sectorial management.

Is There An Integrated Overall View of the Plan for Developing Sectorial Management?

The Procedural Instructions on Working Out the State Economic and Social Development Plans (1980) state that the plan for improving the management of the national economic sectors is to be worked out as a system of measures (see p 765). Such wording is found only in the Section "Planning the Improvement of National Economic Management." It is not found in any other of the 25 sections of the Procedural Instructions. Even from this it is possible to feel that at present the plan for improving management is viewed as a range of separate (and, as we will endeavor to show below, insufficiently systematized) measures.

Improving the management system is to be carried out in four ways or areas:

- 1) The organizational structure;
- 2) The technical support of the management systems;
- 3) The skill of managerial workers;
- 4) Management methods.

The validity of such a grouping of measures arouses some dispute. There is an obvious imbalance in the groups in terms of the content and role in improving the management system; the qualifying feature on which the grouping is based is unclear; the entire aggregate of phenomena is not covered; finally, there has been a confusion of differing concepts.

From the text of the Procedural Instructions and the forms of the plans it is obvious that by improving the organizational structure one understands the following:

- 1) The creation and development of production and other associations;
- 2) The elaboration and implementation of plans for territorial-production complexes;
- 3) Concentration, specialization and cooperation in the basic element of production;
- 4) The conversion of the enterprises to a shopless structure;
- 5) Improving the composition and structure of the associations and enterprises as well as the management structure;
- 6) Increasing the size of the industrial association;
- 7) The rational allocation of functions between the managerial workers and so forth.

Although not all the measures have been listed here included by the current procedures in the given group, it is already clear that they are of a diverse nature and certain of them obviously duplicate one another. The development of concentration, specialization and cooperation is a form of improving the organization of production. The establishing and development of associations, the improving of the managerial structure and the conversion of the enterprises to a shopless structure are forms of the organizational structure of management. The rational allocation of functions between the managerial workers, the elaboration and use of progressive norms for the number of managerial workers and so forth are measures relating to the rationalizing of managerial work. Is it valid to link together three different areas and put them in the improving of the organizational structure of management?

The headings or grouping are not so harmless as may seem to the uninitiated eye. These determine the planning procedures and the end effectiveness of planning depends on them. For example, it is impossible to add up the effect of setting up and developing associations and from the measures related to the specializing of the associations and enterprises; the effect from concentration, specialization and centralization of auxiliary and servicing production; from establishing specialized types of production at affiliates as this frequently leads to the duplicating of the effect and to double accounting.

The December (1983) Plenum of the CPSU Central Committee pointed out that recently much has been done to improve the quality of the state plans. "But still," emphasized Yu. V. Andropov, "there are many weak points in our planning mechanism. Certain key tasks of economic development are often adapted to the existing conditions in one or another region or sector. We must consistently avoid this, so to speak, passive approach in planning." This applies largely to the methodology of sectorial planning, too.

How Is Production Concentration Planned?

At present, measures related to improving the organizational structure are incorporated in the plans of the sectorial management elements by the "addition method" for the measures worked out in the production associations and enterprises (the report indicators are obtained by the same manner). At the same time, it is well known that concentration and specialization on the level of the plants and even the production associations are far from being the same thing as concentration and specialization on the sectorial (subsectorial) scale.

There must also be an analysis of the criteria by which the forms of production organization (concentration, specialization, cooperation and the forming of combines) are judged. The establishing of a small tool shop at a machine building enterprise is immediately reflected in the reports as an indicator of the development of specialization and in line with the increase in the production volume also as an indicator for increasing production concentration. The effect from this measure is also figured. But from the national economic viewpoint this is ineffective as it impedes true concentration, peace and production specialization and as a whole the establishing of highly efficient specialized production.

Unfortunately, instances when the sizes of an enterprise are increased by the "method" of concentrating technologically different products at it are rare. The new machine building plants are basically being built as integrated ones. With the existing organization of production it is hard to realize the most important advantage of the new means of labor, their high productivity. The use of many types of modern equipment under these conditions is economically disadvantageous and the introduction of others produces an economic effect below the possible. One of the main reasons for this is the poor methodological elaboration for the planning of production concentration and specialization.

The question is not limited to these shortcomings. However strange it may seem, in the section "Planning the Concentration, Specialization, Cooperation and Integration of Industrial Production" there are no indicators and forms of a plan for production concentration. Attention is given merely to planning production specialization and for this the Procedural Recommendations propose a number of indicators.

In order to employ them, the head sectorial design organizations should work out norms for the optimum amount of production. However, for the 11th Five-Year Plan, the plans for the development of production specialization have been worked out by only certain ministries and for far from all types of products produced by them. As of now, only the USSR Ministry of Electrical Equipment Industry has established a method which meets modern requirements for working out the dimensional series of optimum capacity for the specialized production of electrical equipment. On the basis of these standard series have been calculated for the optimum size of production for a number of articles. In other ministries, the indicators for production specialization have not been set with sufficient soundness and do not always reflect a national economic approach.

Since the quality of the plans for production specialization which are submitted to the USSR Gosplan is low, these materials are virtually not analyzed, not

coordinated, not generalized and are not reflected in the national economic plans.¹

We would also point out that the indicator "Volume of Net Product (Normed) or Commodity Product as an Average Per Object of Management of the Basic Element" as planned in the section for improving management cannot be used to describe production concentration. The calculating of average amounts for aggregates of dissimilar composition is unacceptable. But these are precisely the aggregates of enterprises and associations in a majority of the industrial sectors.

For example, the food industry includes enterprises and associations from over 20 subsectors, the electrical equipment industry has 5 and so forth. Naturally, it is virtually useless to plan an indicator for the size of an association and enterprise as an average for the USSR Minpishcheprom [Ministry of Food Industry] and the USSR Minelektrotekhprom [Ministry of Electrical Equipment Industry].

The plan indicator "Proportional Amount of Product of Sectorial Specialization in the Total Product Volume of the Ministry (Department)" duplicates an analogous indicator from the section "Planning, Concentration, Specialization, Cooperation and Integration of Industrial Production" (see p 203 and p 767 of the Procedural Instructions).

In order to overcome the phenomena of spontaneity in forming the production apparatus and in order to gradually eliminate the "narrow departmental" and "local" forms of organizing production, it is essential to revise the existing procedure for planning the forms of organizing social production, that is, concentration, specialization, integration and cooperation.

The Object

The question arises: why does the plan for improving management include only measures related to developing organizational forms of production, the organizational structure of management and the rationalizing of managerial labor? If the plan regulates the development of concentration, specialization and cooperation, then why does it not cover the planning of the technical level, the introduction of progressive production methods, the mechanizing of production processes, NOT [scientific organization of labor] and other aspects of the scientific and technical development of production? Only comprehensive, interrelated planning of all aspects of production can provide the required effect.

On Indicators

The Procedural Instructions provide for the separate planning of measures in the area of improving the technical support for management systems. The following indicators have been recommended: the technical equipping of management labor, the completing of fixed capital or computer equipment, the operating of office equipment, the average annual value of fixed capital, including computer

Yu. S. Muntyan, "Specialization--An Important Factor for Intensifying Production," PLANOVYE KHOZYAYSTVO, No 6, 1981, p 25.

equipment, and expenditures on carrying out measures to improve the technical support for management systems.

Basically, these indicators are expenditure ones and do not provide a true notion of the actual equipping of management labor. Moreover, they largely duplicate the indicators in another section of the comprehensive, economic and social development plan "Planning the Introduction of Computer Equipment."

The changeover proposed by certain specialists to an indicator of a capital-to-management-labor ratio (including the value of buildings, utilities, structures and so forth used by workers of the management apparatus) is unsuccessful. This indicator scarcely possesses greater merits.

Will the labor of managers be more effective if the administrative-management building is built not out of cheap standards units but rather according to a special design? Or if the offices have expensive furnishings? Moreover, an indicator for the value of fixed capital calculated per worker of the managerial apparatus cannot always be determined. Certainly in the administrative building working side by side are not only managers but also other employee categories (for example, production engineers or designers). How can one divide between these groups of specialists the value of walls, sanitary-technical equipment or the dining room?

We feel it would be better to work out standard work areas and the supply of modern office equipment for the individual groups of management workers and the corresponding quota would be included in the section "Planning the Introduction of NOT" in the comprehensive social and economic development plan. But in the plan for improving management, in our opinion, there should be no provision for the development of technical support for the management personnel.

At present, one indicator is planned for increasing the skills of the management personnel; the number of specialists to be trained in the advanced training system. But would it not be more logical to plan skill improvement for specialists within another section of the plan "Planning the Training and Allocation of Specialists with a Higher and Specialized Secondary Education"? A capable graduate of a technical school who has studied bookkeeping will scarcely do poorer work on modern computers than a bookkeeper with 20 years experience who has taken 3-month advanced training courses.

Why should the training of these specialists be examined in different sections of the plan?

Obviously, in the following five-year plans it makes sense to switch over to integrated planning of training, advanced training and retraining of the specialists. For now it is advisable to keep the planning of this indicator within the improvement plan, as this makes it possible to focus attention on the problem which up to now has been neglected.

At the same time, we must eliminate the independent planning of measures to improve skills, having combined this with other quotas relating to increased effectiveness and quality of activities by managerial personnel (the use of

progressive norms for the size of the management personnel, standards of manageability and the indicator "Expenditures on Management Calculated Per Million Rubles of Product").

Let us point out that, as analysis indicates, planning the indicator "Expenditures on Management Calculated Per Million Rubles of Product" up to now has had a formal nature. Management expenditures are rigidly controlled both centrally by the approved limit allocations for running of the management personnel and by the limit for the number of its employees. Moreover, each year the USSR Ministry of Finances establishes for all ministries (departments) quotas for reducing management expenditures. Regardless of such regulations, a majority of specialists feels that the current procedure for planning management expenses is ineffective. However, it would be possible to give it up and change over to planning only the expenditure indicator in the instance that this indicator is figured not from the achieved level but rather by using progressive norms differentiated for the industrial sectors (subsectors).

The Economic Mechanism

The fourth group of measures in the plan for developing management--improving the management methods--has also caused a number of disagreements. Is it sufficient to limit oneself to working out and fulfilling centralized measures or would it be better to organize the planning of the improvement of the economic mechanism on all levels of managing production? In our view, the second approach is preferable.

Improving the economic mechanism must be planned on all levels, starting from the USSR Gosplan and the other USSR state committees, ministries and departments and running down to the basic production element. In certain production associations interesting experience has been gained in planning the development of internal cost accounting, brigade methods of organizing labor with adequate changes in material-technical supply and in the saving of resources. In accord with the management level, problems should also be stipulated which can be settled by the appropriate management body.

It might be argued that this is being done. Unfortunately, far from always. Since the current procedure does not provide an ordered system for planning the development of the economic mechanism, improving the management methods frequently does not keep pace with economic practice. Let us assume that decisions are taken after difficulties and disproportions have occurred and that the impetus for a solution is not only the negative phenomenon, but also its consequences, for example, personnel turnover and alerts in the press. In this instance, more time would be needed for rectifying the situation than in the preventive improvement of the economic mechanism.

The method of improving management by the "afterword principle" is substantially inferior to the directly opposite method of anticipation or forecasting. Hence, the need to strengthen the role of long-range planning for improving management methods. We feel that those economists are right who consider that we must work out the basic trends for the development of the economic mechanism.

At conferences, seminars and courses conducted by the ministries (departments), the industrial and production associations it would be possible to rather quickly assimilate the list of economic changes and appreciate their role and importance. But the entire question is that the results of these changes depend primarily upon the possibility of carrying them out and doing so comprehensively. For this, there must be careful preplanning work and economic experimentation which would ensure the introduction of the new economic tool. Putting it figuratively, the quality of planning the improvement of the management mechanism depends upon the preplanning studies and economic experiments just as the success of a performance depends on the rehearsals. The working out and introduction of new management and business principles from the experience of the 1965 economic reform lasted a number of years. "Nevertheless, there was not a comprehensive introduction of this reform." At present, when the changeover is being completed to the management methods envisaged in the Decree of the CPSU Central Committee and the USSR Council of Ministers of 12 July 1979, it must be recognized that the sectorial plans do not provide for their full assimilation.

The advantages of the planned system of management are not realized automatically. If the plan is not balanced, if it does not meet the capabilities of an economic organization or runs counter to the economic interests of the collective and its individual workers, the possibilities of effectively developing production are not fully realized in the sectors and at the enterprises.

The transformation of all the elements of the systems is observed far from everywhere. Regardless of the fact that the preparations to introduce an indicator for normed net product and transform the system of physical planning indicators occurred in the early 1970's, difficulties arose in incorporating these measures in the plans for improving management at a number of ministries. The introduction has basically been by the "trial and error" method. One might merely recall that in introducing the indicator for normed net product in territorial management in certain sectors the old indicator of the volume of sold product was kept. This led to very negative consequences. Only in April 1982 were instructions worked out calling for the establishing of uniform criteria for assessing enterprise operations by the sectorial and territorial management bodies.

For the food industry enterprises put into operation after 1970, construction expenditures have exceeded the planned ones by 14 percent, wages per ruble of commodity of product have been 133 percent higher while product output (minus material expenditures) has reached only 33 percent and labor productivity 28 percent. The corresponding indicators for the Ministry of Construction, Road and Municipal Machine Building are 38, 56, 62 and 78 percent and for the Ministry of Machine Building for Light and Food Industry and Household Appliances, 5, 33, 35 and 44 percent.

"A System of Introduction for the Management Mechanism," PRAVDA, 15 February 1982.

A. Bachurin, "Intensification and the Effectiveness of Capital Investments," PLANOVYE KROZYAYSTVO, No 3, 1983, p 10.

It is not enough to include in the plan norms for reducing the resource intensiveness of construction and the development of new production capacity. In addition, it is essential that these norms be coordinated with specific measures causing the design and construction organizations as well as the sectorial staffs to employ only progressive technical solutions. Certainly due to economic designs a reduction in the expenditures of resources lowers the amount of commodity construction and this the construction workers are not interested in. There must be an economic incentive for both the designers, the clients and the construction workers to widely introduce the achievements of scientific and technical progress and advanced experience.

The forecast and the long-range plan (basic directions) for improving the economic mechanism should ensure a more rapid "stock" of ideas and experimentally tested solutions. These determine the main forms, methods and ways for organizing economic processes.

Although this area has been worked out less than others it, in our opinion, should become the leading one.

Of fundamentally important significance for organizing work in the area of improving the economic mechanism is the Decree of the CPSU Central Committee and the USSR Council of Ministers "On Additional Measures to Broaden the Rights of the Industrial Production Associations (Enterprises) in Planning and Economic Activities and to Strengthen Their Responsibility for the Operating Results." In accord with this decree, a number of economic experiments is to be carried out. It must be assumed that the policy of broad-scale improving in the economic mechanism will also be reflected in the five-year and annual plans on all management levels.

How Is the Economic Effect Calculated?

The current procedure for determining the economic effect from measures in the area of improving management cannot be considered successful. Economic activities are too complex and, as a rule, it is impossible to uniformly classify various economic results to one or another factor and particularly one or another measure. A series of factors with the existing organization of accounting cannot be measured reliably at all.

Many measures in the plan for improving management are duplicated in other sections of the comprehensive economic and social development plan (planning the introduction of computers, planning industrial production, planning the introduction of NOT and so forth). For this reason the totals of the economic effect from these measures are also duplicated and this leads to double and sometimes triple counting.

Such duplication of measures is related not only to the defects of sectorial planning (there is no precise concept in the Procedural Instructions for working out the state plans, the methods for ensuring comprehensiveness of the plans and reciprocal coordinating of their sections have not been sufficiently worked out and so forth), but also with the financing procedure and the methods for encouraging managerial activities.

In the five-year plan of Minelektrotekhprom for 1982, there were 128 indicators (plus 54 for Moscow and Leningrad) and here the plans were drawn up using 231 forms. The annual plans contained almost the same number of indicators. The excessive detailing led to a situation where for many ministries the volume of planning documents which each year are worked out and submitted to the gosplan over the last 10 years has increased by 2.5-3-fold. Moreover, a large portion of this increase has been due to such "nonworking" indicators as those examined above.

What Will the Plan for Improving Management Be Like?

Several variations are possible. In the near future, probably the most realistic is to work out a procedure for a plan the object of which will be only the development of the managing system. One can propose the following grouping of measures and indicators for the sectorial plans for improving the managing system.

1. Improving the management methods (quotas for working out new forms and methods of management and for carrying out major economic experiments, measures and indicators for the gradual introduction of new elements of the economic mechanism and so forth).
2. Improving the organizational structure of management (setting up and developing production, scientific-production and other associations, establishing industrial associations and other measures related to the centralizing of production; converting to the shopless management structure and so forth).
3. Increasing the effectiveness and quality of the work done by the management apparatus (the rational allocation of functions between the management workers, employing progressive norms for the number of engineers, technicians and white collar personnel on all levels, introducing norms for expenditures on management, improving the skills of management workers and so forth).

The basic task in the plan for improving management, in our opinion, is to ensure the economic and organizational conditions for carrying out the quotas of the state plan while its framework is scientifically sound economic norms. The methodological recommendations for calculating some of these have already been worked by the Scientific Research Institute for Planning and Norm Setting under the USSR Gosplan.

Planning concentration, specialization and other forms of organizing production is advisable within the appropriate section of the comprehensive economic and social development plan while the plan for improving management must contain norms, indicators and measures which will ensure conditions for the progressive forms of organizing production. Such an approach (for example, the creating of organizational conditions for the integrated use of new equipment and production methods) should also be employed in those areas which regulate the development of the managed object. Very attractive is the use of specialized norms or indicators for the balance sheet coordinating of the sections of the economic and social development plan with the indicators of the plan for improving management.

For example, the plan for improving management can be coordinated with the section of the plan regulating the development of production concentration, specialization, cooperation and integration by using the norms "The Rational Level of Plant Production Concentration" and "The Proportional Amount of Optimum Size Production Associations."

The proposals voiced in the article cannot be considered indisputable. Possibly, these could be countered by other, more effective ones. One thing is clear: the plan for improving management should "work" and be an effective tool of economic regulation.

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TYPES OF USER SERVICES PROVIDED BY COMPUTER CENTERS TRACED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 114-116

[Article by A. R. Myagi, Candidate of Technical Sciences and Director of the Computer Center of the Design Bureau for Control Systems under the Estonian Ministry of Light Industry in Tallinn: "What Services Do Computer Centers Offer Users?"; the article is written as a reply to the article of Yu. M. Kanygin and N. A. Parfentseva "How Should the Work of Computer Centers Be Planned and Judged?" in EKO, No 3, 1983]

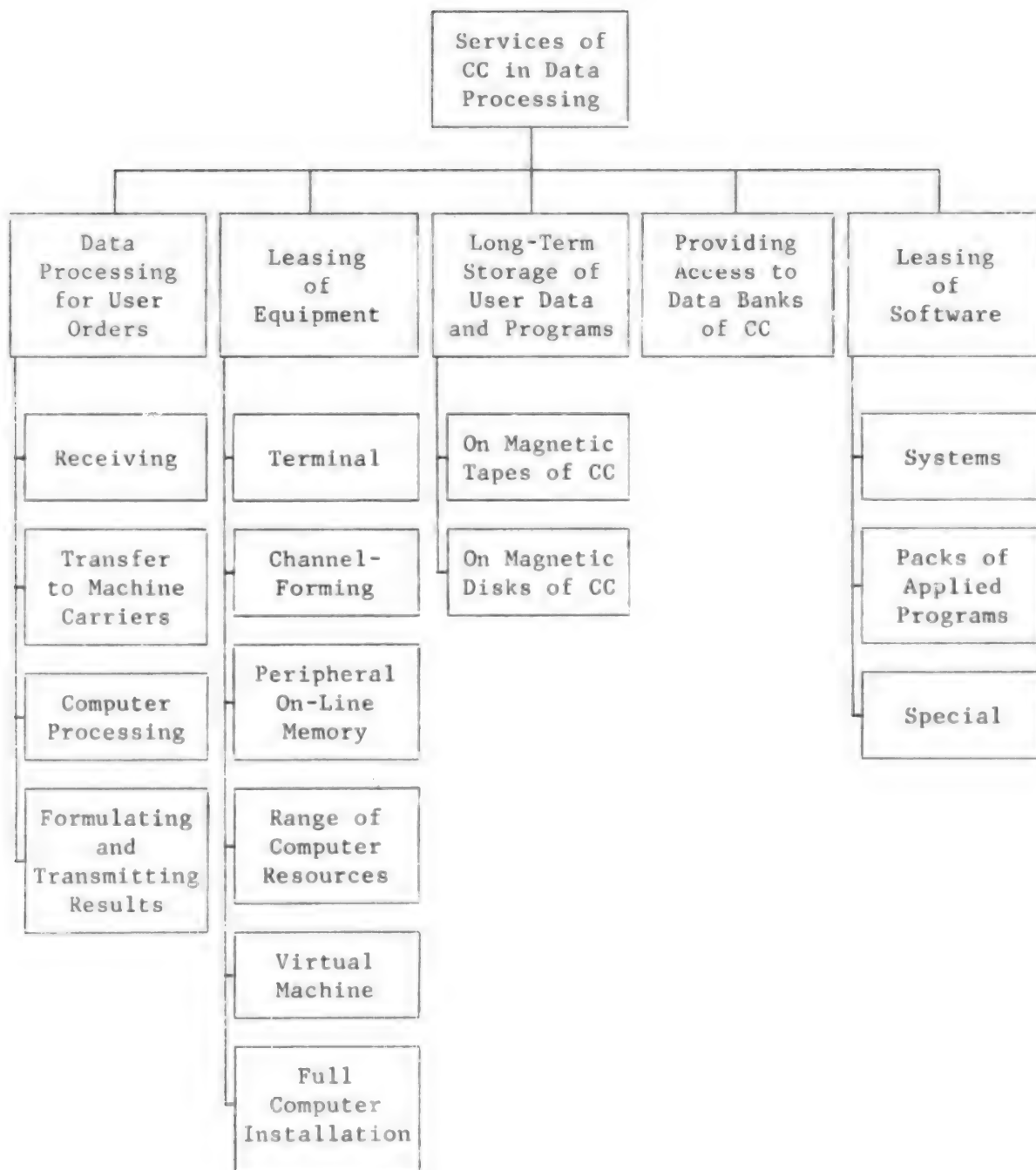
[Text] Machine information science is a new national economic sector and is in the stage of development. The principles of its economy have not yet been established and much requires theoretical background work. What indicator most fully reflects the activities of this sector? The amount of processed information, the number of problems solved or, possibly, an increase in profit for the users?

In foreign literature the basic elements of machine information science--the computer centers [CC]--are frequently called data processing factories. The raw material for these factories is the initial data while the finished product is the information. We would point out that the same opinion is upheld by Yu. M. Kanygin and N. A. Parfentseva. By the term "information" one understands the data processed into a form convenient for use (decision taking). Such a view of the activities of a CC is extremely oversimplified as the processing of information is only a portion of the services provided by the CC. A classification of the basic types of CC services in the information processing sphere has been given in the diagram [on the following page].

The first and still dominant group is comprised of services related to processing user data by the CC personnel. In a rough form this is the receiving, converting to machine carriers, computer processing, making up and transmitting the results to the users.

The second, systematically increasing group is made up of equipment leasing services. Any computer equipment can be leased which is on the basic balance sheet of the CC.

With the development of remote-access equipment, this group of services is becoming the dominant one, particularly at the collectively used CC. The CC



workers provide the users with an opportunity to operate the computer independently and they themselves are not involved in the process of solving their problems. Here the number of introduced symbols and the number and complexity of the problems solved no longer depend on the CC personnel who may not know at all for what reason the user is employing the computer.

The third group is services for the long-range (up to several years) storage user data and programs on the machine carriers, that is, the CC magnetic disks and tapes.

The fourth group is services related to providing the users with access to data stored in the CC data banks. The contents of these data banks can be the most diverse, for example, data on free beds in hospitals, seats on airplanes and trains, economic and statistical data, abstracts of articles and so forth. We would point out that the running of the large computerized data banks involves great expenditures and the expenditures on a single request depend upon the total number of requests over the designated period.

In the fifth group are services related to the leasing of software. Programs are a commodity which is sold by the centralized holding of algorithms and programs and by other organizations and is purchased by computer centers.

As is seen from this far-from-complete list (here we have not examined services related to the designing and programming of user problems, consultation, the training of user personnel and so forth), the CC provide very diverse services to the users. The scope of each type of service is determined in its own specific units, for example, for equipment leasing in units of time while the volume of processed data is given in symbols. Hence, the end results of the activities of different CCs can be compared only in monetary terms. Clearly under these conditions there is a sharply increased role for such indicators as profit and profitability which depend upon the soundness of the rates for the CC services. The current price list No U-01 provides only a rate per hour of used computer time. As paradoxical as it may seem, this rate cannot be employed for any of the examined types of services.

From what has been given above, it follows that the planning and managing of machine information science require at least the solving of the following questions:

- 1) The establishing and adopting of a classification of CC services;
- 2) The working out of accounting, planning and financial normative documents for each type of service;
- 3) The working out for each type of service of a uniform statewide price formation procedure and, possibly, unified statewide rates.

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METHOD OF CALCULATING COMPUTER CENTER FEES PROPOSED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 117-118

[Article by A. Ye. Gazaryan from the Information Computer Center of the Lithuanian Central Statistical Administration in Klaypeda: "How Should the Operation of a Computer Center Be Judged?"; the article is written as a reply to the article of Yu. M. Kanygin and N. A. Parfentseva "How Should the Work of Computer Centers Be Planned and Judged?" in EKO, No 3, 1983]

[Text] In our view, for assessing the activities of computer centers [CC] it is essential to employ only those indicators which depend upon the collective of the CC itself and not upon external circumstances. Among the external circumstances, although this may seem unusual, one can also put the economic effect from solving ASU [automatic control system] problems as this depends not so much upon the CC employees as it does upon the production volume of the user, upon the level of production organization (if suddenly after the introduction of the ASU, this organization has improved) and upon other factors which the CC does not influence. For this reason, encouraging the CC employees proportionately to the economic effect created for the user cannot serve, in my opinion, as the basic form of their incentives.

The sought economic mechanism should operate, as a minimum, in two areas: encourage the economic advisability of employing computer equipment for solving the given problems of the user and encourage the computer solving of problems with the least expenditures with the set demands on the timeliness and reliability of the information.

The cost of the services provided by the CC, we feel, is a completely acceptable indicator for the effectiveness of its work, as is confirmed by the many years of the actual use of the cost indicator in the computer system of the USSR TsSU [Central Statistical Administration]. The indicator can be employed all the more successfully the more objective the method of determining the volume of work of the CC. Enough has been said about the failings of determining the amount by the actual expenditures of machine time, but it would be difficult to agree with the proposed method for determining the amount from the number of problems solved at the CC.

The very term "problem" contains no greater certainty than the word "work." Numerous attempts to concretize the concept of a "problem" and employ it as a

unit for quantitative evaluations of the ASU have not led to anything intelligible.

At the same time, the common denominator for determining the amount of work done at the CC lies on the surface, and is their cost which should be calculated using progressive intersectorial price lists. As these price lists will differentiate the work by types, physical units of measurement and so forth, the question is already a practical one and a good deal of experience has been acquired in solving such problems. The client is less interested in the internal concerns of the CC such as the expenditures of machine time or the necessary number of commands. The prices should take into account the consumer value, for example, of the time and quality of carrying out the calculations. In this instance the CC will be interested in constantly improving its methods and, very importantly, in using less expensive computers. The use of powerful expensive machines for solving simple problems, in being disadvantageous for the state, should not be advantageous for the CC. Incidentally, this is the case at present. Then the actual expenditures of the CC in comparison with the amount of work carried out by it will actually be a measure of effectiveness and not "instead of effectiveness."

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RAW MATERIAL, PACKAGING, REPAIR PROBLEMS IN KAZAKH CANDY INDUSTRY

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 119-129

[Article by N. B. Tanashev, chief of the Kazakh Main Administration for the Candy Industry in Alma-Ata, and R. P. Povileyko, Candidate of Technical Sciences from the Novosibirsk Institute for Soviet Cooperative Trade: "Bitter Tears of a Sweet Sector"]

[Text] The candy industry is one of the leading sectors of the food industry. It is responsible for 18 percent of the gross product of the food industry workers. In 1982, some 3.8 million tons of candy products were produced. This means that there were around 14 kg of them per capita. The output of such an amount of product was possible due to expanding the production capacity of the enterprises and increasing the raw material resources of the sector.

However, the output of candy products still does not fully satisfy the increased demand of the population. At the same time, the sector has a number of reserves the active use of which could substantially alter the contents of the store shelves. As for the reserves, let us examine the example of the candy industry in Kazakhstan.

The First Problem--Raw Materials

It seems to us that no industrial sector so depends upon the delivery of raw materials as the candy industry does. Certain types of products, for example, cocoa bears, can only be imported. This basic component in many candy products before reaching the factories must be transported for a long time over oceans and seas, railroads and highways. We receive almonds, peanuts, cashews and much else by the same manner.

However, in this situation there is a particular problem. The VNII [All-Union Scientific Research Institute] for the Candy Industry, in basically relying on imported types of nuts, is unwilling to include domestic raw materials in the recipes for candy products. Although, if they so desired, the candy industry could be filled with domestic nuts, for example, the magnificent Persian walnut from Kirghizia. And so it turns out that we purchase the raw material for foreign exchange, ship it in from the ends of the earth, but our own goods we do not use properly. For this reason, the candy industry, like no other, is particularly exposed to the influences of the international market.

It is quite obvious that we should rely on local raw materials as much as possible. But the paradox is that all of this is recognized in words but does not reach as far as facts.... Once, the Kustanay candy workers were given an immediate order to manufacture candy products employing dry whey. They developed the glazed candies such as the "Zhalyu," "Ritm" and "Koster," but these good candies did not make it to the store. Departmental barriers prevented this as well as the inability to properly plan and coordinate the deliveries of raw materials. Unfortunately, this is not the only instance where the efforts of the candy workers have been in vain in "conjugating up" the most amazing types of products with all sorts of raw materials but which do not reach the mass purchaser.

So, it is not merely a question of raw materials but also one of poor planning and the organization of supply. As an example, the Kustanay Candy Factory requires dried and condensed milk and other dairy products. The Kustanay workers obtain all of this from Kemerovo, Ufa and Kursk although nearby their factory, just 100 m away, is a very large, nationally important plant which produces whole dry milk and Kustanay Oblast has well developed dairy livestock raising and large milk processing enterprises.

Or let us take another important raw material for the candy industry, apples. You might think that the Kazakh enterprises obtain these from Alma-Ata which, as is known, in translation from the Kazakh means "The Father of Apples." You are mistaken. The apples are received here not from Krasnodar Kray, not from the Stavropol area, from the Ukraine, but rather from overseas. The apples arrive sulfated in large polyethylene bags which have been packed in special 200-kg oak barrels. And the sulfated apples have an excellent substitute, powdered apples. In using this, the candy makers could get by with 10 kg of powder instead of 200 kg of apples. The amount of powdered apple in comparison with the sulfated is 20-fold less while its storage is many times better. For storing the powder it is not necessary to have special conditions or refrigerated lockers. Among other things we would point out that the methods for preparing the powdered apple has not been the handy work of scientists in the food industry but rather Ukrainian thermal physicists!

The high effectiveness of employing powdered apple in the candy industry was mentioned by the President of the USSR Academy of Sciences A. P. Aleksandrov, in speaking in 1982 in Krasnodar at the All-Union Conference on Carrying Out the Food Program. The enormous benefit of powdered apple has been recognized by everyone. But, fortunately, it is having a very hard time making headway in the candy enterprises. In 1982, the candy makers of the nation expected 10,000 tons of this powder but obtained only an insignificant amount. The Kazakh candy makers instead of the promised 200 tons received just 10 tons of powdered apple. On the other hand, apples in imported barrels arrive punctually at the candy factories.

The rational use of apples is a major problem of intersectorial significance. Incidentally, the candy workers receive the best varieties in the best form. But they should proceed otherwise. For example, the apple crop has been harvested and the best should be made available in a fresh form for trade while the remainder directly at the fruit and vegetable and canning combines should be split up between children's food, canned goods and the candy worker. In turn,

almost all the apples delivered to the candy makers should be converted into powder. This is how they proceed in Moldavia at the Bukuriyskiy factory and in the Ukraine in Voroshilovgrad. The effect is a significant one. And to boot, at present the candy workers lose up to a million rubles a year just in imported barrels. After unpacking the sulfated apples, these oak barrels are simply burned up as there is nothing to do with them as the packaging is not standard....

After the May (1982) Plenum of the CPSU Central Committee, a republic Food Commission was organized in Kazakhstan consisting of representatives from three ministries, the Minplodoovoshch [Ministry of Fruit and Vegetable Industry], the Minsel'khos [Ministry of Agriculture] and Minpishcheprom [Ministry of Food Industry]. Three ministries at one table is already a good thing as it is a prerequisite for the bringing together of their interests and efforts.

What About Packaging?

In the candy industry the question of the deliveries of packaging is no better than that of raw materials. Basically, two types of packaging are used--wooden and corrugated cardboard boxes. Just the Kustanay Candy Factory requires more than 10,000 units of different packing daily. If this is not available the factory shuts down as the candy cannot be shipped loose in trucks. Nevertheless, the factory receives a total of 50 percent of the required amount of new corrugated boxes for candies. The remainder is supplied from wherever and in a completely unsuitable state employing boxes for soap, herring and nails.... This must be sorted out by size and shape, washed and dried. The candy workers do not throw out even the most unsuitable boxes, otherwise there would be nothing to load the product. Everything goes for production. And as a result instead of the two types of packaging, up to ten are employed and for this reason the labor intensiveness and costs of the product in the sector are increased by 15-20 percent. In addition, up to 5 percent of the finished product is lost.

All these difficulties with packaging need not exist if the candy workers received only boxes from corrugated cardboard for packaging their products. For now their share in the total volume of packaging materials is slight. There has long been a need for working out and implementing an entire range of measures both of an intrasectorial and intersectorial nature aimed at replacing the wooden packaging with corrugated cardboard.

It would be wrong to think that an effort had not been made to solve the packaging problem. One fine day, one of the higher leaders from the Kazakh Gosstab spotted rich reed thickets near Kyzyl-Orda. What could be easier? Here it was, a raw material for cardboard, lying, as they say, on the very surface. It was merely a matter of taking it and setting to work! Without any special reflection or calculation, a large cardboard paper plant was put up. Only the reed quickly was depleted and now ordinary lumber is shipped in to Kyzyl-Orda several thousand kilometers. The plant operates intermittently and produces for the candy makers special-sized boxes just...3 or 4 days a month.

The Importing of Machines is Perilous

In the candy industry there is a large amount of imported machines and equipment. In a majority of instances the candy makers receive not a system of imported

Because the company did produce the product for only a portion of the year, the machine's yearly operating schedule is presented and not completely reliable. Machine usage and other data were in great difficulties. In order to allow our evaluation of the machine, the basic functions are listed in Table 11 based on domestic data for the reported quantities. In the given situation, for the machine and building work, they have adopted a unit for the rated equipment of machine capacity (COPM) described in the experimental plant of the AF (unpublished). The domestic machine for the candy industry. The productivity of the machine and building equipment is 11 tons of product a shift with CO (carbon) load for the air is 0.8 tons. As a result, the production capacity of the entire design of units is reduced and the capacity of the equipment is only 60-80 percent available. The point being made is that about solutions for manufacturing complete products.

The four Egyptian leaders included in Washington's statement, Abdelaziz Bouteflika, Abdelhakim Belkaid, Abdelhakim Zaidi and Abdelhakim Zaidi, were a prominent group of specialists in specialized equipment from the Egyptian army and intelligence. At present, the FBI, the DHS, FBIHQ and other agencies are working.

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What more be done, in such a situation? The emergency currency has been introduced in 1940, 1941, 1942 and the Government has issued the necessary instructions for its use. The Government has also issued instructions for the use of the currency in the case of a general strike. The Government has also issued instructions for the use of the currency in the case of a general strike. The Government has also issued instructions for the use of the currency in the case of a general strike.

On the one hand, they are interested in accelerating the repair times and on the other they are unable to do this as they lack the required materials and spare parts. On these grounds, production conflicts arise with the workers demanding that the administration sign the papers for completing the basic jobs of repairing the equipment on time for only in this instance are they guaranteed a high wage. Frequently, the administration makes such concessions. If you do not pay the workers as you should now, then tomorrow you will be left without skilled lathe operators, milling machine operators, machinists and other specialists.

The papers for the completing of repairs were signed, as they say, by hook or by crook. But after the basic equipment was back in operation, the product volume declined, as a rule, by 25-30 percent in comparison with the level previously achieved. Moreover, in the post-repair period there was a sharp rise in the output of rejected product. A great deal of additional labor was spent on re-doing it. All of this is reflected in the state of production and labor discipline for the basic personnel. The workers show a lessened responsibility for the end result of the labor and a nervous situation reigns in the collective and ultimately this contributes to the already high personnel turnover in the candy industry.

What is the way out of the arising situation? At present, each candy factory is forced to have its own repair and machine shop. In their majority these are small artisan shops. The production area is too small, the mechanization level of such shops is low, special machines are lacking and there are not enough highly skilled specialists. All of this causes the comparatively high expenditures of labor and materials on carrying out the repairs. Add to this that special-made equipment, particularly foreign produced, must be repaired in such shops. In their technical development the repair shops of the candy factories lag significantly behind basic production. And it is certainly obvious that such a disproportion does not contribute to the normal operation of the factory as a whole.

The way out is to establish large enterprises repairing equipment for the food industry. Kazakhstan has tried to follow this path. Even at the beginning of the Ninth Five-Year Plan the Remmekhanizatsiya [Repair and Mechanization] Plant went into operation in Alma-Ata. It belongs to the republic Ministry of Food Industry and for this reason in addition to the candy industry also serves the baking, beer brewing, winemaking and many other food industry sectors. If you adds it up, the Alma-Ata Plant should serve more than 100 enterprises each of which has a small, sometimes simply dwarf (three or four machines) repair shop. Thus, Remmekhanizatsiya should provide substantial aid to the food workers in repairing the equipment. This was the noble goal pursued in designing and building the Alma-Ata plant. What in fact happened?

Remmekhanizatsiya is alive and flourishing, it steadily overfulfills the plan and broadens its production facilities. But the food workers gain little from this. The plant overfulfills its plan not by repairs but by intensely increasing the output of shelf containers for shipping bread, and wire baskets for bottles.... There is no doubt about it, these simple articles are also essential for the food workers. However, in becoming involved in producing ancillary products, the Remmekhanizatsiya Plant has still not assumed its specialized role.

Or, more correctly, it will not acquire it for a long time. For example, in the preparatory shop of the Karagandi Candy Factory there are five good imported mills. These grind the dry chocolate bulk into powder. The machines operate virtually around-the-clock without halting. Naturally with such intensive operation the metal wears out and the mill rollers are particularly susceptible to this. And in fact, one of them did break down with a crack forming on it. They initially thought, as usual, to weld it. They looked in the operating specifications but the structure of the roller metal was not given. The candy workers turned to the Kazakh Chemical and Metallurgical Institute. The specialists conducted delicate spectral analysis of the roller metal but this took almost 3 months. And during this time the factory closely watched the work of the remaining four mills as the load on them had significantly increased. What would happen if another unit would fail and now would they fulfill their plan? Fortunately, everything ended well. The fifth mill was soon back in operation and special electrodes had been found conforming to the composition of the metal and a new repair method developed.

But the moral from this is clear. The Karagandi candy workers succeeded in repairing the imported mill in one way or another and they found a key to one of its secrets. But it is shameful that even this key did not become known to the specialists of the Remmekhanizatsiya Plant of the Ministry's administration of the Chief Mechanical Engineer. They took no part in repairing the mill. How many such secrets discovered at the candy factories pass by the republic Remmekhanizatsiya Plant in a year? They cannot be counted. But it would be completely different if the plant and the sectorial scientific research institutes and design bureaus took up all these keys to secrets, kept the found methods, developed them and established a holding of stores and hundreds of such repair methods. Certainly this is very important, particularly when you are involved in repairing imported equipment about which, unfortunately, we often have only superficial knowledge. Things would be better if the Remmekhanizatsiya Plant would be truly specialized in the larger and more complex types of equipment repairs. And the repair and machine shops existing under the various plants could be converted into affiliates of Remmekhanizatsiya. These also could be specialized. For example, the Karagandi Candy Factory would repair the five-roller mills, the Kustanay Plant would produce spare parts for the automatic twisters, the Aktubinsk would carry out repairs on barrel equipment and the Almaty Plant would repair equipment for chocolate production. In this instance the republic Remmekhanizatsiya Plant would be left to repair the special-made imported equipment.

It has been estimated that a well equipped and supplied repair facility would make it possible for the Kazakh candy industry to increase product output by up to 15 percent and this would be the equivalent of ten additional railway cars of various sweets per day.

Such an addition can come by solving that one problem, the rational organization of repairs for candy equipment. And how many can be obtained by solving the raw material and packaging problems? Undoubtedly, a great deal. But that still is not all. The obtained result can be solidly increased by the effect provided from employing a sectorial automated control system with well organized and thought out production. All of this can be obtained without tangible capital outlays.

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PROGRESS, PROBLEMS AT MAGNITOGORSK STEEL WORKS TRACED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 130-146

[Article by Nikolay Tereshko, journalist from Chelyabinsk: "Magnitka: What Is Over the Horizon?"]

[Text] Magnitka [the Magnitogorsk Iron and Steel Complex] for me has been a pleasant memory. Here I learned the rudiments of life and my profession. And here I learned that simple and wise truth which has become the measure of deeds, both my own and others: as one is in labor and life, so is your value.

I recall the party organizer of one of the sheet rolling shops. He was tall, lean, quick but not hurried. With a perpetual cigarette in a well-used holder. I have forgotten his name but not the lessons. No matter how early I showed up in the shop, he was already there, and no matter how late you looked in, he was still there. For me, a beginning journalist, he showed a degree of attention and, I would say, understanding which helped recognize the essence of things but never showed condescension for the person who only had a bookish view of life.

Then I realized that one must live openly and not fear anyone. One must not be afraid of turning to others for help and one must always give it. And I also realized that Magnitogorsk was a city which accepted a person completely as he was or rejected him outright. And I very much wanted to be accepted again as I had 20 years ago.

A Pleasant Delay

In this enormous, I would not say enterprise, but rather a city-plant, night and day they cook not only iron and steel but also a very tasty borscht, they not only roll sheet but also "mill" thousands of people and teach them to live. Here they have their own traffic safety service and daily information on innovations in technical and artistic literature. In brief, their own world. But most of all I was struck by the fact that among the fire-breathing giants a young man sat on a wooden bench whetting his scythe. Just like a peasant before going into the meadow....

Magnitka had given the country a helping hand three times: during the years of industrialization, during the terrible time of the war and during the days of

peacetime reconstruction and for this reason its name had almost become a common name for there is a northern Magnitka, a Kazakhstan Magnitka and a Lipetsk Magnitka. But there has always been and remains the main and first Magnitka. The very legendary one.

At Magnitka there were for me two unforgettable spectacles: the view over the city at night and the work of the loopers in the rod-strip shop. Both were exciting. But the loopers, these circus acrobats of an industrial enterprise caused a double feeling. I went to see them often, I did not ask questions, embarrassed by my idleness next to their work. I merely watched them work with dumb amazement and sympathy realizing that I could never do this and did not even want to.

Imagine a small screened space between two sections of a rod mill. In it was a man with a pair of tongs, the looper. Rod crept out of the openings of the mill like molten macaroni. The looper seized this with the tongs and turning with it and with amazing precision and speed directed it into another part of the mill where the rod assumed the size set for it by the standard. The man made a loop with a molten serpent in his hands. It was, in my mind, an operation just as dangerous as a "loop" for a pilot. The looper worked 15 minutes then rested 30, wiping the sweat off his face.

Much later I learned that the temperature of a loopers body by the end of a shift had climbed to 39°. He went home in such a state that anyone else would have to go to bed and take medicine. But the next day he reappeared to do battle with the fiery serpent.

If this dangerous job still remained at Magnitka, I thought, it meant that there had not been any particular changes. The shift had just changed, there were no people in the shop and I was suddenly lost among the moving conveyors with molten, cooling and already cold rod packed in enormous bales. Here I also met with shop chief Boris Porfir'yevich Burdov who still had not been able to leave for home although his workday was officially over. We introduced ourselves and he asked the reason for my coming. I said that I wanted to take a look at the loopers.

"Oh, you are several years too late," laughed Burdov. "'Grishka' has replaced them."

"Who?" I asked Burdov with surprise.

"Not who but what. It is a repeater. Come into the office, I must have a talk with the director and then I will show you 'Grishka'."

"Grishka," "Airplane" and Oxygen

The intercom was buzzing but I had a hard time understanding the words flying here from other shops and did not particularly understand the figures and terms if I did grasp them. Burdov was a picture of attention.... He had arrived at the shop a quarter of a century ago as an apprentice machinist. It was not even his goal to become the chief of the shop or even a mill. He merely studied and got better in his trade. At the combine Burdov is known as a

good engineer. And not only in the sense that he knows and is able to organize the production process. For a leader this goes without saying. He is particularly valued for something else, his creative vein. Everywhere possible he endeavors to mechanize human labor. In the shop now there is no operator of the distribution desk. But at that time there certainly was. A person watched the molten billets coming out of the furnace and pecked like a woodpecker on the buttons, sending the metal into the required opening of the mill. There were four buttons. But the fumes and dust, the heat and the monotony of the operations led to a situation where a person without fail made a mistake and pushed the wrong button, confusing the sizes. For a long time Burdov sought a design for a distribution drum, cutting its parts out of wood trying one thing after another. Later, watching his wife clean and cut potatoes, he realized that it would be easier to make the model out of potato.

Boris Porfir'yevich designed the distribution drum along with other engineers and workers from the shop. He has also done much else, for example a device for marking tags. Some 13 women using punches and hammers night and day made tags so that the bale of rod went to the consumer with complete technical specifications. Some 25 digits had to be punched on each tag. The tag was small, the stress was high over the entire shift and the hammers were hard on your fingers. The women's fingers were completely cut up. Burdov could not see them without pity and indignation. From this he began to design a device. He did, he introduced it and was content....

The intercom meeting was over and Burdov was ready to continue the conversation.

"Why 'Grishka'?" I reminded Boris Porfir'yevich.

"And why 'Airplane'?" he replied and seeing that I again did not understand anything made a calming sign with his hands. "I will reward your patience now as there is something to see."

He pulled out a large box and from it a handful of photographs and spread them out on the conference table. He described, compared and pointed. Now it was clear how much in the shop had been mechanized, almost the entire production process. It was no accident that the designed capacity of the mills had been surpassed by 3-fold. But it was not clear why the repeater was called "Grishka" and why an attachment for transporting the hot bales of rod was an "Airplane."

"Who knows?" said Burdov shrugging his shoulders in surprise and broke into a quiet, satisfied laugh as if watching the dear amusements of his child. "Believe me, even now, in the watch log they write 'a jam up on Grishka.' and everyone understands."

"It is just like Magnitka," I exclaimed, "and at the same time it is not!"

At first Burdov did not understand my excitement and explained: "How could it not be?! Magnitka is always Magnitka."

The production engineer from the blast furnace shop, Vladimir Aleksandrovich Domnin, was the complete opposite to Burdov in appearance. He was tall and thin.

It was his way to confirm in writing that the combine, and in particular the blast furnace shop had done a great deal so that Magnitka remained the flagship of Soviet metallurgy. Here are just a few of the dates which are memorable for the blast furnace workers of Magnitka:

1964--natural gas was brought into the shop and this made it possible to carry out iron smelting more intensely;

1965--in collaboration with metallurgical workers from the Sokolovosko-Sarbaynskiy Ore Processing Combine, the Magnitogorsk workers began to use metal pellets, it was a difficult matter but ultimately an excellent result was obtained making it possible to partially solve the problem of an ore supply;

1971--oxygen-enriched blasts were introduced and smelting occurred even more intensely. Now each furnace produced metal up to 14 times a day instead of 6 as had been the case 20 years previously.

But Still the Same Scrap to Work With

Now Magnitka had the best coefficient in the USSR for utilizing the effective volume of the furnace. Moreover, they had built two new, more powerful blast furnaces. Significantly more iron was being produced than previously.

By the efforts of the master of blast furnace operations, Vasiliy Vasil'yevich Konnov, who is well known throughout the Urals, the temperature of the hot blast was raised from 800° at which the blast furnaces had been kept for decades up to 1,250 and higher. With the increase in the blast temperature, the furnace arches began to break down more rapidly. As the blast furnace workers said, the refractories melted. It was essential to seek out a more fire-resistant raw material. They decided to introduce mullite-corundum refractories which had been talked about for decades but some reason the workers in the scientific research laboratories had been cool to these. The Magnitokorsk workers themselves found the sources for the raw material in the wastes of abrasives production in the town of Volzhsk. And they themselves transported them to the combine, and made the refractory packing materials on a new basis. The furnace arches began to last longer.

All of this was seemingly a good thing. However, at Magnitka they feel that the blast temperature could be raised even higher, that the refractories could last even longer but these must be made on a new basis, a carbide-silicon one. Glavogneupor [Main Refractories Administration] of the Ministry of Ferrous Metallurgy received the corresponding order from Magnitka. The blast furnace workers wanted to test out a new composition. And if things "got going" at Magnitka, it would be possible to accelerate the process of producing ferrous metal and the new technology could be recommended for the nation. But...Glavogneupor remained silent.

The tone of our conversation in the blast furnace shop changed. From major to minor as soon as the question arose of reserves. The person I spoke with categorically and in a single voice asserted that even now the blast furnace workers of Magnitka could produce significantly more iron if the rear support of

production had not fallen behind. In actuality, while the shop has made many good changes, these still have not touched the essence of the steel casters work. As before, they receive the same scrap, there are the same pick and shovel and the same principle of take more and get farther.

In the blast furnace shop there are more problems than they would like and they surround the blast furnace workers along the entire production chain, from preparing the charge to turning out the metal from the furnace and transporting it to the next stage. Trains with components for future smelting arrive one after the other. The hopper trestle is old and is designed for just four furnaces but now there are ten! There is not any ore yard for the shops. Another rail line is particularly essential. Without solving these problems it would be hard to speak about prompt and high-quality preparation of the charge and about the proper and not forced overloading of the furnaces.

Of course, the blast furnace workers are doing a good deal not to remain idle. Even now the designed capacity of the blast furnaces has been surpassed by 2.5-fold. But, in the opinion of production engineer Domnin, it could be raised even higher if the furnaces were supplied with more oxygen. The problem of oxygen injection equipment is very acute. In a year, the combine can build one new oxygen injection unit but now six of them must be replaced. If there was sufficient air of the required pressure, it would be possible to more quickly mechanize the steel casting work. In an instant the sledgehammer could be gone.

"Such problems could be re-enumerated and re-enumerated" added Domnin sadly. "The transfer and slag ladles, the bridge for processing slag and the casting units.... Whatever you like! Magnitka operates on enthusiasm, on the high awareness of people."

Each blast furnace has its own creative groups which has good plans to modernize the units, intensify the production processes and increase labor productivity. But the furnaces are old, they are grouped together and there are no free industrial sites. There is nowhere to extend the rear services. The obsolete designs of the blast furnaces themselves do not permit the modernizing of the equipment let alone the introduction of new, as a rule, heavy and powerful. For this reason the working conditions leave much to be desired and the growth of labor productivity has lagged.

Domnin recently visited the younger shops of the nation. And how far behind are those enterprises which bore the entire burden of the pressing needs of the state but were not allowed to catch their breath along the way! And far ahead is domestic metallurgy where the enterprises were able to be established on the possibilities of today. For example, Lipetsk. The blast furnace shop there is full of electronic computers, white overcoats and a fine microclimate....

"Would you like to work there?" I asked Domnin.

"Not work there but rather as they work," he corrected me. "I would very much like to have such a shop here. Magnitka deserves it. But there is no reason to abandon it...."

Then I returned to Burdov in the rod-strip shop for he also had no intention of working at a new enterprise. His rule was not to seek where it was better but rather to make it better around yourself. He also wanted to work only at Magnitka but only under better conditions.

"Labor productivity and product output must be increased not by enthusiasm," Boris Porfir'yevich said firmly, "but rather by modernization. In our old shops the possibility of modernization is virtually exhausted. We cannot incorporate new equipment. And on the old how can you do more if it dates back to the 1930's"?

As a curiosity it goes beyond the 1930's! At the combine there is a mill operated by a steam engine! It is almost a century old. It had ended its time when it rolled armor for tanks. Is it not time for the "grandfather" to be pensioned off?...

From 7 in the Morning to 7 in the Evening

With such vital questions late in the evening I made my way to the office of the temporary chief engineer of the combine Mikhail Grigor'yevich Tikhanovskiy. I was in a hurry fearing that I would not catch him because of the late hour. My fears were in vain. Although it was 9 o'clock at night, the entire "staff" of the giant enterprise was still at work. I recall that 20 years previously here they had joked that at Magnitka there was a 7-hour workday, from 7 in the morning to 7 in the evening. The joke had been not without some bitterness. However, at present the shift for the production leader has been further lengthened. As I understand, it is not an easy life.

In the situation existing at the combine, when the technical possibilities, to put it mildly, conform little to those high demands which the glorious collective places on itself, in desiring to remain the leader of domestic metallurgy, this has been inevitable....

"I could tell you that you are 5 or 6 years late with your questions as a minimum," commented Tikhanovskiy. "But today I would not say this. Although a decision has been taken to completely reconstruct the combine and although not only the technical and economic feasibility studies for reconstruction have been drawn up but also a significant portion of the working plans, the questions of the technical state of Magnitka are as pressing as never before. For there is a great distance from the taking of a decision to its embodiment. It is instructive that 20 years ago a decision was taken to turn the Magnitogorsk Metallurgical Combine into an automated enterprise which would be a model demonstration one for the enterprises of the Ministry of Ferrous Metallurgy. However, the nation had more pressing concerns."

But still gigantic work has been done to increase product output and new production capacity has been put into operation. "But today, like yesterday, Magnitka works with difficulty," replied Tikhanovskiy tersely. After a long pause he explained:

"Each year, tens of millions of rubles are invested into modernizing the equipment of the combine's shops. A turning point for the enterprise was the introduction of process oxygen in casting production, the reconstruction of the open

hearth furnaces as two-bath units and the reconstruction of many rolling mills. But all of this was just half-measures. Did labor productivity grow? Undoubtedly it did. At present, each worker at the combine produces an average product of 55,000 rubles a year. This indicator over the last five-year plan rose by 20,000 rubles. Has metal production grown? Yes. The effectiveness of the capital investments is the highest in the sector and repayment does not exceed 5 or 6 years. Net income in 1982 was 800 million rubles and it has almost doubled over the five-year plan. But still the main question has not been resolved and the intensity of live labor continues to remain extremely high."

Tikhanovskiy spoke strictly but sharply about the technical condition of the enterprise. A large portion of the fixed capital which had been in operation 40 years was not only obsolete but also physically worn out in the immediate sense of the word. The sintering mills and coking batteries had long since served their time.

"The high organization of labor," said Tikhanovskiy, "and the unswerving observance of production and labor discipline are what we hold to. It is our good fortune that we have such a collective, that we have indoctrinated such people as our workers."

And he himself is a worker, Mikhail Tikhanovskiy. Here, at Magnitka, he has moved from an apprentice excavator operator to one of the leaders in the nation's largest industrial enterprise. He was born in Belorussia. The war left him an orphan. As a 15-year-old juvenile, with a fourth-grade education, barefooted and hungry, he climbed aboard the first train he found moving east. Fate brought him to Magnitogorsk which he had not even heard of.

"That is fate," Tikhanovskiy smiles now, "they say that fortune is blind. In my instance it kept a good eye on me. The luckiest thing was that I came here. Once and for all."

These words can be trusted. Repeatedly Tikhanovskiy has been offered a higher position than the present one but in other cities, including in the capital. But he could not leave Magnitka.

Smiling, he puts his hand on his heart and says: "Magnitka has touched my heart, as the poet said...."

Our lyrical dialogue was interrupted by a business call with the director saying that things were over for now and he was heading home. Tikhanovskiy took the hint but said that he would stay a little longer with the correspondent.

I looked at my watch and it was 9 o'clock in the evening. Tomorrow at 7 a.m. all the commanders of Magnitka would be back at their staff. That was the accepted thing. That was the necessary thing.

Unprincipled Changes

At the beginning of 1975, measures were worked out to increase the production of iron, steel and rolled products, to improve the quality of the produced product and broaden the assortment, to replace obsolete machines with modern highly

productive equipment with the maximum automating of the production processes. In particular there were plans to build new rolling shops, an oxygen converter shop, coking batteries and a sintering conveyor and modern-type blast furnaces. Plans were also made for extensive sociocultural and service construction for improving the living and working conditions of the metallurgical workers.

What has been done? Seemingly a good deal: a shop for bent sections has been built, blast furnace No 2 and the "2,500" hot rolling mill have been reconstructed; the coking battery 8-bis has gone into operation as well as an enormous coke by-product plant with a capacity of a million tons of acutely needed raw materials a year and a cost of 23 million rubles. The new coking battery is a highly mechanized unit equipped with special devices which ensure smokeless loading and ashless product output. For the first time at the combine a furnace has been equipped with bottom gas supply. This makes it possible with greater accuracy to regulate the coke roasting temperature and hence improve its quality and consume heat economically. The new unit greatly eases the work of the coke by-product workers. It is also equipped with the necessary devices for protecting the environment.

In a word, for many other enterprises such a scope of construction and reconstruction would be outstanding. But not for the Magnitogorsk Metallurgical Combine.

I learned the details of what had been planned and what had been done later from talking with the director of the Magnitogorsk Gipromez [State Union Institute for the Designing of Metallurgical Plants], Aleksandr Mikhaylovich Litvak. He was a rolling mill worker and I remember him as the chief of a rod-strip shop. With good reason the thoughtful engineer had chosen science and defended a dissertation. But his science was a most alive practice. Over the 20 past years Aleksandr Mikhaylovich had virtually not changed. He was just as calm and correct, and it seemed to me had no more gray hair. Only his face showed aging fatigue.

"To what degree does the technical state of the combine meet the level and requirements of today?" I said asking my chief question.

"Unfortunately, it no longer does," replied Litvak. "We have fallen behind in modernizing the equipment even from our targets. The technical plans worked out by us for reconstructing the combine at first encompassed the entire production complex and solved altogether the basic problems on a modern level. In putting things in sequence this appears to be the case."

Litvak gave me a copy of an article which he had written together with the combine's chief engineer Yu. V. Yakovlev for the journal STAL'. With the permission of Aleksandr Mikhaylovich I will briefly retell some of its ideas. The Magnitogorsk Metallurgical Combine in terms of the production volume is one of the nation's largest enterprises. Having significantly exceeded the capacity of a majority of units, its collective of 60,000 workers produces 10-12 percent of the nation's iron, steel and rolled metal. However, in terms of the technical level, the combine lags behind the enterprises built in the postwar years. A struggle for the quality of the produced product is gaining in importance.

In accord with the reconstruction plans, the following major changes were to be carried out. In ore-dressing production the sintering mill No 4 and the dolomite-roasting plant were to be reconstructed and five processing and crushing mills were to be taken out of production. Two rotating kilns were to be built for roasting dolomite and three fluidized bed furnaces for roasting limestone. In the future one powerful sintering mill was to be built in the place of the three to be taken out of operation out of the four presently being employed.

For supplying the combine with coke instead of the obsolete and worn out batteries two new ones were to be built. One of them has already been built and a second is under construction and its capacity is a million tons of coke and its cost 30 million rubles.

The major changes were planned in steel casting. Specialists have estimated that 35 open hearth furnaces at a single plant are an anachronism. A majority of these should be abandoned and in their place just three large converters with ten continuous steel casting units. The new shop would not have any analog in the nation. It would resolve a range of problems. For example, the casting units would be both slab and sectional. The very casting method makes it possible to more effectively utilize the steel in rolling and this will produce an additional million tons of product. There is also sense in abandoning the blooming stage of the metal. The delivery of the molten iron to the converter shop will be carried out in larger ladles, up to 420 tons. The iron will be delivered by underground tunnels to the charging bay of the converter division.

In rolling production the following obsolete and physically worn out mills are to be removed: the "4500," the rod, strip, with the reconstruction of the blooming mills and the replacing of the "1450" mill by a "1300" mill. In addition, there are plans to build shops for the fourth stage, a cold rolling shop for carbon strip, and a plating shop with hot and electrolytic galvanizing and polymer covering units.

In this production there are modern achievements. A group of Magnitogorsk metallurgical workers received the USSR State Prize for developing the production of high-precision cold rolled sheet for offset printing. An offset sheet on a steel base is a comparatively new thing for our metallurgy. For many years the necessary steel plates were purchased overseas. The accomplishments of the Magnitogorsk workers eliminated the dependence of the printing industry on foreign deliveries and eliminated significant foreign exchange expenditures.

Over a period of 10 years the Magnitogorsk workers have carried out a broad range of theoretical and experimental works. They have clarified the technological parameters for obtaining high-precision hot rolled sheet and have tested out the stages of cold rolling and finishing of the product. In order to create a new technology and give it life it was necessary to solve a number of fundamental problems a large portion of which were taken up for the first time in the nation and, let me point out, was carried out on a level of inventions.

"But the changes in rolling production are still not fundamental and are actually compromises. We are trying to incorporate new production on new units in

old buildings. This cannot happen without losses," commented Litvak. "If we wish to keep Magnitka as a phenomenon of domestic metallurgy, then reconstruction measures of the broadest scale should be carried out in the shortest period of time.

A Start Must Be Made

The decision for the next and now integrated reconstruction of the combine stirred Magnitka. The Magnitogorsk workers themselves worked out plans and ways for modernizing the enterprise and actively helped in drawing up the technical and economic feasibility studies for reconstruction as carried out by the Moscow Giprometz. The Magnitogorsk Giprometz in a short period of time worked out the technical plans and turned out the working drawings for carrying out a number of operations in this enormous and expensive campaign. The leaders of the combine and its engineer corps for years to come had worked out a program for the involvement of the large collective in carrying out the most important tasks for the enterprise. Seemingly Magnitka would be transformed before their very eyes.

However, the transformation dragged on. The Ministry of Ferrous Metallurgy [Minchermet] must be concerned for the first factor as allocations for reconstructing the enterprise have been and are being allocated stingily and must be given two or three times more generously. Certainly to draw out the time of complete reconstruction is an expensive matter. Even now documents have been prepared for several years to come to carry out the reconstruction. At the same time, they have stopped working out plans for building the oxygen converter shop. However, the funds allocated for building this project must be utilized in a maximum of 3 years, otherwise, as they say, it will already be old hat. Why should they be working so hard on the plans if the beginning of construction for the new shop is not planned? This is what Litvak feels. He is afraid that the plans can be completed quickly and then they will lie in safes and will be totally obsolete so that when they are eventually carried out Magnitka will again be behind the times. In a word, there is only one way out of the existing situation and that is to build more rapidly and reconstruct the combine on a mass basis. Certainly this is also realized at the Minchermet. For the current five-year plan, the ministry has increased the allocations somewhat. But this is not sufficient. The ministry is scattering the basic resources and using all opportunities to increase individual scarce capacity at many enterprises without focusing on technical reconstruction. But reconstruction of Magnitka is a comprehensive matter and here the effectiveness of allocations is great. Thus, over the two previous five-year plans, the reconstruction of Magnitka saved the state 350 million rubles.

But the reconstruction of Magnitka presupposes a somewhat different logic. It should occur not so much by a quantitative increase in product output as by qualitative changes. For instance, not everything has been done to produce rolled products with guaranteed mechanical properties or rolled products suitable for manufacturing machines and units employed under the extreme conditions of the North. Reconstruction of the rolling mills should pursue precisely these goals. Precisely this is the crux of reconstructing the hot rolling mills "2500" and "1450." Although another goal of somewhat increasing the produced product is also being pursued. For instance, for the "2500" mill,

this will be 500,000 tons of sheet a year. The Minchermet planned that the "2500" mill will be reconstructed in 1983. However, the construction of the steel heat treating division at it was planned only for 1985. And the reconstruction of the "1450" mill has been put off to a future five-year plan.

The existing situation is in no way the result of someone's ignorance of today or tomorrow. No, heavy machine building must be developed "for the day after tomorrow" just as it was by Sergo Ordzhonikidze. Then there would not be today's shortage of capacity. And then for the numerous large metallurgical plants and combines the nation would have only several enterprises building blast furnace, steel casting and rolling units. Clearly the order portfolios would be full for years to come.

The press has raised the appeals before: "The time has come to develop the base of metallurgical machine building." Everyone realizes that this is not an easy thing and not something done in a day. But a start must be made!

Now for some particular proposals. The Magnitogorsk workers have proposed turning over the All-Union Scientific Research Institute for Metallurgical Machine Building to the Minchermet. Then it would be closer to its clients and could more effectively consider their needs. Secondly, on the basis of the Uralchermet [Urals Ferrous Metallurgy] Association, production should be organized for spare parts and units for the Urals metallurgical plants. The idea is more than timely. Certainly not only Magnitka is now behind the demands of the times in terms of its equipping; the other enterprises have similar concerns.

In truth, certain steps have already been taken in this area. In particular, on the basis of the Ufaleyskiy Metallurgical Plant, in essence, a new plant has been established for repairing metallurgical equipment. One of the first iron-producing plants in the Urals, it has changed beyond recognition and is now the newest in the sector. But the Ufaleyskiy workers feel that for now their enterprise is nothing more than the ministry's "firefighting team." The plant produces just one-fifth of the specialized product such as rotors, wheel sets and springs. But it should produce....

One other question of the raw material supply of Magnitka. The present practice when the ore travels 2,000 km to the Urals creates an unsteady work pace at many of the regions metallurgical enterprises. But it is a fact that the Urals have not completely discovered their own reserves and its treasures are richer than we had thought. It is essential to go deep into the Urals.

Another solution also has been suggested. We must accelerate the development and reconstruction of the Kachar and Sokolovsko-Sarbayevskiy Ore-Processing Combines and improve the methods of producing enriched ores. Here the situation is complicated by the position of Uralgiproruda [Urals State Design Institute for the Ore Industry]. With its blessing the leaders of the extracting enterprises have permitted the mixed exploitation of rich ores with poor ones. The ores are constantly being diluted with barren rock and the notorious gross increases and the indicators raised. The magnetic concentrating of rich ores together with poor ones causes great iron losses which are lost in the dumps of the processing mills. The amount of iron in the tails is sometimes more than

the content in the ore. The future of Magnitka, like the other Urals enterprises, is seen in accelerating the pace of technical reequipping.

The Urals has long been a support of the state. At present the time has come when the state should become a support for the Urals, rejuvenate them and make them more powerful. This will be paid back a hundred-fold.

As I was saying goodbye to Tikhanovskiy at the entrance of the plant administration, Burdov came out of a passage. He did not notice us. He walked across the uncustomarily empty square in front of the plant lost in deep thought. Then he stopped and looked closely at the plant as if bidding it a good night.

And in the already gathering summer dusk somewhere ahead the skies turned crimson with a new casting. A new dawn had risen over Magnitka.

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ORGANIZATION OF GDR COMBINES AS MANAGEMENT TOOL EXAMINED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 147-157

[Article by A. N. Mikhaylin, Candidate of Economic Sciences at the Moscow Management Institute imeni S. Ordzhonikidze: "Combines in the GDR"]

[Text] In the GDR, in accord with the decisions of the Tenth SED [Socialist Unity Party of Germany] Congress, they are continuing to convert to the intensive path of development. The factors for extensive growth have been virtually depleted, the shortage of labor resources has begun to be felt more acutely and expenditures are growing on the development of science and technology and on the exploitation of minerals. The mining of one ton of brown coal now costs 1.5-fold more than 10 years ago. The GDR is not rich in minerals and is forced to import raw products, materials and energy sources. This places increased demands on the growth of national economic efficiency as a whole and, in particular, on increasing the volume and profitability of exports.

The SED constantly gives attention to the quality factors of economic growth: to accelerating scientific and technical progress, to improving skills and bettering the structure of the workers, to more fully processing raw products and materials, to further strengthening the principles of cost accounting, to improving management on all national economic levels and so forth.

The central element in the reorganization of management in the GDR was the transition which ended by the start of the 1980's to combines (production associations) as the basic management elements in industry, construction and transportation. The republic presently has 156 combines of central sectorial subordination and 66 local industry combines. They are responsible for more than 90 percent of the nation's industrial product. The combine under single leadership brings together all stages of production from applied scientific research and design development to the selling of the finished product and the servicing of customers. Associations of people's enterprises, as a form of a middle level for managing the industrial subsectors, have been completely abolished.

Advantages of Combines

More than 90 percent of industry's scientific and technical potential is concentrated in the combines. Due to this the organizational prerequisites have

been established for the effective elaboration, introduction and broad use of the most recent scientific and technical achievements. At the same time the combines broaden the creative collaboration on a contractual basis with the scientific research organizations of the GDR Academy of Sciences and the VUZes conducting pioneer fundamental scientific research and development. For example, the Industrial Robots Scientific and Production Association (Karl Marx Stadt Bezirk) includes five combines, three independent industrial enterprises and three VUZes.

The combines successfully realize the advantages of large-series and highly specialized production as there is an opportunity to substantially reduce the proportional production outlays, save raw products, materials and energy, and produce high-quality products employing more advanced equipment and production methods, progressive systems for organizing labor and a comprehensive system of quality control in all stages of production.

The most skilled labor force is concentrated in these economic subdivisions and out of their 3 million employees some 300,000 have a higher or specialized secondary education and 123,000 work directly in scientific-technical organizations. Operating successfully in the combines are around 150 socialist management academies for improving employee skills.

The combines more effectively than independent enterprises control the foreign economic ties. Those of them which export a significant portion of their product have received the right to enter foreign markets directly, in truth, under the overall supervision of the GDR Ministry of Foreign Trade. The world market operates as a universal objective criterion for the effectiveness of national production and for the quality of the goods and services.

Principles for Uniting the Enterprises

In the GDR, in contrast to the USSR and certain other CEMA members, the enterprises which are part of a combine maintain their legal independence in accord with the Provision Governing People's Combines approved in November 1979.

How is this independence expressed? In the right to settle independently with banks and conclude economic contracts with subcontracting partners. Here the enterprises are completely responsible for carrying out these contracts. Such a situation is caused by the fact that the combines include numerous small and medium-sized enterprises scattered over the entire GDR territory and the organizing of relatively self-contained cycles of expanded reproduction has not yet been completed.

If the economic and legal independence of a combine's enterprises impedes the normal course of production and reduces the effectiveness of management, then it can be converted into an enterprise with all the production associations operating on internal cost accounting.

The management of the combine is organized considering the range of produced products, the nature of reproduction and the relations between its basic, auxiliary and subsidiary processes, the development of internal specialization, integration and cooperation the size, number and specialty of the individual

enterprises and their location as well as the nature and volume of foreign economic ties.

Forms of Combine Management

In the GDR there are three basic forms of managing the combines: through a head enterprise, through a special apparatus and through head or leading enterprises. Let us examine the specific features of each of these.

The head enterprise. In a number of combines the medium and small plants supplying parts and assemblies unite around the strongest, basic enterprise where the end product is assembled. Here is concentrated the basic share of the scientific-technical, production and labor potential and for this reason it determines the specialty of the entire combine, dictates the production pace for the remaining plants, organizes their effective interaction and rational use of capital investments and provides the necessary aid and services. The questions of operational planning are settled directly at the enterprise and control over applied scientific research and design developments, material-technical supply and marketing, foreign economic ties and the elaboration of long-range programs for the combine's socioeconomic development are centralized.

A special management apparatus. This, as a rule, is employed when:

- 1) The combine includes enterprises that are equal in capacity and size and produce an end product of independent consumer purpose;
- 2) Of the several enterprises it is impossible to establish the basic one;
- 3) The enterprises are located far apart;
- 4) There are ~~broad competitive~~ or diverse foreign economic ties;
- 5) The combine produces several products which are important from the national economic standpoint.

As in the first form, the operational management of production is carried out at the individual enterprises while all the remaining functions revert to the competence of the workers of the central staff. It, as a rule, includes the chief bookkeeper and a state inspector for organizing technical inspection (these are appointed, respectively, by the Ministry of Finances and the State Committee for Standardization, Metrology and Product Testing), a lawyer, an inspectorate for safety equipment, a social security section as well as directorates (sections) for scientific research and development, production questions, for equipment, the rationalization of production and the use of fixed capital, for material-technical supply, for marketing and foreign economic ties, for economic questions and for the organization and processing of information. The directorates are headed by functional directors who along with the enterprise directors comprise the combine's directorate which is a body of collective leadership.

Head or leading enterprises. This form of management is employed when enterprises are brought together to several sectorial ministries or located in groups in different parts of the nation. In the appropriate group (sector) the largest head enterprise is established and this determines the specialty of the group. The most important management functions (working out a development strategy for the combine, determining the basic proportions and so forth) remain under the control of the general director while the management of applied research and development, material-technical supply, marketing and so forth is assigned to the director of the head enterprises.

The general director is directly under the minister and is appointed and relieved by him. He manages the combine on the basis of the principle of sole responsibility with the collective discussion of fundamental questions relating to the development of the combine and its subdivisions, in collaborating closely with the party organization, the trade union and other social organizations. The deputy ministers do not have the right to issue instructions and supervise the actions of the general director without the appropriate permission from the minister. A general director can reassign productive capital and working capital between the enterprises for their most effective utilization.

Combines and Changes in the Planning System

The setting up of combines required a certain reorganization of the planning system. The center of gravity for planning work has largely moved to the combine level. They work out their own plans on the basis of the state plan quotas, directive indicators, limits and norms. There is a constant search for indicators which focus the collectives on the end national economic results, on increasing product quality and maximum savings of resources. The ministries set the following indicators: the basic types of products in physical units, net product, the share of superior quality products, consumer goods, quotas for the growth of labor productivity and for reducing costs, export profitability, commodity product and so forth.

Starting in 1976, the GDR combines, in accord with the long-range plans for production, scientific-technical and socioeconomic development of the nation, were obliged to work out their own five-year plans with subdivisions for production, material-technical supply, marketing, scientific research and experimental design development, participation in the integration measures of the CEMA countries, the development of the labor collective, the organization of management, data processing and so forth. In turn the annual and five-year plans of the enterprises are based on the long-range plans for the combine's development.

On the basis of the long-range programs for scientific-technical progress, the combines since 1967 have worked out "Logs of Obligations for Science and Technology." For all scientific research, these are approved by the general director or the minister (depending upon the importance and complexity of the developments) and are approved by the State Committee for Standardization, Metrology and Product Testing and the Department for Artistic Designing of Industrial Articles.

The "Log of Obligations" consists of two parts. The first outlines the goals and national economic importance of the scientific research and design developments and describes the corresponding economic indicators, the forecast for the production volume of new products during the year of introduction and the beginning of series production and the decline in the proportional consumption of raw products, materials and energy. It also describes the use of domestic raw products, wastes and secondary raw materials, the specific conditions for introducing a technical innovation (the purchasing of imported raw products, equipment, licenses and so forth), the saving of working time and the release of workers, the growth of labor productivity for consumers and producers, the reduction in costs, the increased volume and profitability of GDR exports and the reduced imports from non-socialist states. The basic stages and times for completing the work are set out.

The second part describes in detail the articles and production methods, it defines the responsible executors, the basic partners in subcontracting, the artistic design of the articles, methods of legal defense, patenting and the granting of licenses and analyzes the market for the new product. For example, the "Log of Obligations" in developing a new model of a milling machine with an automatic control system at the Fritz Heckert Combine set the following tasks: to increase labor productivity for the consumers by 80 percent and for the manufacturers by 50 percent, to reduce the proportional consumption of materials by 54 percent and in the new design to employ at least 60 percent already produced standard assemblies and pieces. As a result of observing the requirements of the "Log of Obligations" at the Umformtechnik Combine in 1977-1980, labor productivity increased each year by 11.2 percent, the total amount of profit by 16 percent while the share of exports increased to 90 percent. At the combine product assortment was completely renewed every 8 years.

The combines give great attention to accelerating scientific and technical progress by innovation (monitoring and metering instruments, fittings, automation and mechanization, including industrial robots). In 1981-1985, the GDR will work out and put into production 40,000-45,000 robots. The nation is working out a uniform national economic approach to establishing, introducing and utilizing robot equipment. In July 1981, the GDR Gosplan approved the "Method for Calculating the Economic Effect from Utilizing Industrial Robots" and "Working Manual for an Integrated Economic Assessment of Measures to Utilize Industrial Robots." Both documents are obligatory for all economic organizations. A unified data bank has been established on the technical and economic parameters of the robots, their production and employment.

The activities of establishing and using robot equipment in the GDR are being coordinated by a specialized combine (it carries out research and development and produces standard and standardized assemblies, pieces and instruments), the Industrial Robots Territorial Association in Berlin and the Industrial Robots Scientific-Production Association in Karl Marx Stadt Bezirk. Specialized production of robots and standard parts for them is carried out at the Fritz Heckert Machine Building Combine in Karl Marx Stadt.

In-House Production of Innovation Devices

A predominant portion of innovation devices, including robots, will be developed by the combines themselves considering the specific features of their production and advanced domestic and foreign experience. In-house production of innovation equipment has become an important factor in intensifying expanded reproduction at the combines and for introducing the most modern type of technologies. "We have never viewed the production of innovation equipment by the forces of the economic organizations themselves as a compulsory measure caused by shortcomings in the deliveries of equipment by the specialized machine building enterprises," said the secretary of the SED Central Committee G. Mittag in April 1982 in Leipzig at a seminar for the general directors and party organizations of the combines.

In-house production of innovations in the nation increased in 1981 by 4-fold in comparison with 1975 and their value reached 4.2 billion marks. In 1980 alone, the production of these products at the combine's specialized Robotron Enterprise rose by 39 percent. This enterprise employs over 1,200 workers and product assortment is renewed every 3-5 years as an average. Due to the introduction of a new generation of accounting and office equipment based on in-house production of innovations, expenditures of working time for individual types of activities declined by 30-80 percent, the specific consumption of materials and energy by 50 percent, the time for developing and introducing the new product by 30 percent while the quality of the produced articles was significantly improved.

In-house production of innovations also gives rise to definite problems. In the first instance, this does not exclude the scattering of resources allocated for accelerating scientific and technical progress as well as unjustified parallelism and duplication of the work. Secondly, in being guided by its own specific conditions, a combine frequently produces innovations in small series or one at a time. As a result, proportional expenditures of raw products, materials and so forth increase. Thirdly, the problem of standardization of the product can arise.

In this context the republic gives great attention to coordinating the actions of all the economic organizations which are working out and producing innovations. An increased role has been given to the central state bodies which determine the development of scientific and technical progress: the gosplan, the Ministry of Science and Technology and the State Committee for Standardization, Metrology and Product Testing.

In certain sectors innovation bureaus have been established for coordinating in-house production. Such a bureau, for instance, under the Ministry of Local and Food Industry in Halle coordinates the programs for developing and producing innovations, the programs for intensifying various enterprises and combines in the sector, it organizes the exchange of experience between them and establishes scientific-technical and production ties with related ministries within the GDR as well as with the economic organizations of similar specialty from the CEMA member nations. The co-workers of the bureau determine and establish what innovations should be developed and produced by in-house sources and which at specialized machine building enterprises. They also participate in drawing

up the decisions of the sector's minister on questions of scientific-technical development and the international collaboration of the combines.

The successful operation of the combines in the simultaneous improving of planning and in the more active use of economic levers have largely brought about the increased efficiency of the republic's national economy. In 1982, in the GDR, national income increased by 3 percent and surpassed 200 billion marks with a reduction of 2.6 percent in the consumption of materials and energy; some 509 million hours of working time were saved while labor productivity in industry (calculated on a base of net product) rose by 4.3 percent over the year. Higher obligations were also set for 1983. The combines are making a substantial contribution to carrying out the economic strategy elaborated by the Tenth SED Congress.

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METHODS PROPOSED TO SEPARATE ROUTINE, LONG-RANGE MANAGEMENT

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 170-173

[Article by F. Ye. Udalov, Candidate of Economic Sciences and chief of the Section for the Scientific Organization of Labor and Management at the Gorkiy Television Plant: "There Are Different Routines"; the article is written as a reply to the article by V. A. Skripov "Routine" published in EKO, No 4, 1983]

[Text] In the article "Routine," V. A. Skripov aptly describes the style of operational management of production at one of the industrial enterprises, calling the latter a chronic ailment. Obviously, many people, having read the article will say: "We have virtually the same thing." But while such an ailment is not a rarity, there are serious reasons for this. Although a great deal, undoubtedly, depends upon the production leaders, upon their, so to speak, established stereotype of thinking, far from all the factors originate at the enterprise itself. Incidentally, the author says the same thing.

Thus, what has been described is basically correct, but, having read the article, one gains no satisfaction. First of all, because the position of the author himself is unclear and we do not understand what he proposed to rectify the situation. Without this, the article is nothing more than a statement of facts. Thus, in talking about rush work, the author does not take up its sources. In accusing the plant administration of a reticence to study the management system and of a formal approach to introducing innovations, he does not endeavor to explain why the superior leadership holds such a position. In seeing the basic cause of routine in the shortcomings of the management mechanism, "in the slow implementation of the economic reform," he, in essence, does not talk about these shortcomings, reducing them merely to flaws in planning and it is unclear precisely what economic reform he has in mind and how it influences a change in the existing situation.

If all the problems stem from planning which, according to the author, begins high up "where one cannot see, as if you tilt your head your hat falls," then what is the role of the enterprise leadership here? If it is merely that it has not been able to show the unfeasibility of the plan, then the problem is too simplified (if by a real plan one does not understand a desire to obtain an easy version of it). Also incomprehensible is the author's phrase: "Routine should not exist! This is a pathology in management." One might ask how then

will operational management be carried out? Who will resolve the problems of daily production? Or are they to suddenly disappear? But this is also absurd. Or does the author feel that operational management does not include the resolving of routine matters, that is, not routine but rather something else? Then routine work is understood in a too simplified a manner. It has existed, does exist and will exist. It is a reality of production life. Moreover, the development of equipment and production methods complicates the management process, it increases the number of purely operational problems which should be resolved by the production leaders and demands from them increased time on this notorious routine.

At present, we speak more and more often about the information overload on the leaders. Let us assess how this has increased for the leaders of large enterprises over the last 15-20 years. The increased product complexity and demands on its quality indicators have led to a situation where at a majority of the enterprises it has become necessary to have special meetings on quality questions on the level of the subdivisions and higher. The introduction of mechanization and automation in production has required more attention to the questions of labor safety. The acceleration of the pace of scientific and technical progress has shortened the time for producing articles without their replacement or modernization and at many enterprises are being introduced on the questions of new equipment. The introduction of electronic equipment into production management has made it necessary to examine many complex organizational questions on the level of the leaders of the subdivisions and enterprises. Due to the shortage of personnel, the questions of retaining them at the enterprises are also brought up at regular special meetings. The necessity of raising the level of economic work has led to a situation where at a number of enterprises they regularly hold so-called economics hours. In all of this the long-range questions are intertwined with operational ones. But, the most important thing is the increased production volume and the more complex ties between suppliers and consumers have sharply increased the load factor for the management personnel while the very process of operational management more and more has assumed the traits of situation management where the leader is forced to take rapid decisions depending upon the specifically developing situation.

I do not mean to justify these leaders as they are not always and sufficiently concerned with organizing production and devote little, even very little time to the development prospects of the subdivisions. Thus, according to the data of our research, the shop chiefs spend only 5-10 percent of their working time on questions of a long-range nature. However, criticizing them does little to help while routine work more and more absorbs the management personnel, and particularly its operational level. No good intentions help the question. Like it or not, the line management personnel, for example, in a shop or the production workers on the plant level are the first to see the problems of the planning quotas of the month, the quarter and the year while the long run will be concealed from them by routine operational work.

Well, what about technical progress and the introduction of new equipment and production methods? How can science be linked more closely with production? In our notion, there should be a connecting link between them, the so-called specific groups which eliminate the gaps often arising on the borderlines between science and practice. For example, what today impedes the introduction

of new equipment? First of all, the lack of the necessary interest. Science feels that it has done its thing by developing and testing a model and the production workers have been given the necessary specifications. And the production workers, knowing from past experience how thorny is the path from the model to series production, are not exactly keen on assuming an additional burden. But if the functions of developing a new product to the series level is assumed by a specific group, then the development process (and in practice this has been shown repeatedly) is significantly facilitated. It is not necessary to establish new staff positions for this. At many enterprises this process to some degree has been worked out. Only the groups are called not specific but rather assault ones and they are established informally. And they are informally broken up when the work is over. Incidentally, the informality of such groups has provided grounds for evil tongues to assert that the leadership has again eliminated a flaw using the hands of others.

The problems of improving the organization of production and management should be solved in an analogous manner. But here, in our view, there must be specialized subdivisions focused solely on analyzing and seeking out a solution to problems of the long-range development of both the subdivisions and the enterprise as a whole. In some places such subdivisions have already been established and, as time has shown, bring great benefit.

Of course, what has been said does not mean that the production leaders should remain on the sidelines of long-range problems and it can only be welcomed if they upon their own initiative improve production organization. But, we feel, the main role for the leader now is to introduce the decisions proposed by the specialized subdivision. The end result, the effect from carrying out these decisions is determined by the position of the operational leader. And here there should be no place for routine, that is, for the attempt to avoid solving problems (and precisely this is how V. A. Skripov presented it). Unfortunately, in practice leaders are encountered with the view: "You come and not only say what should be done in my subdivision and how but also organize the process of reorganization while I stand on the sidelines and watch what you can do." It can be said ahead of time that nothing will happen in this subdivision.

We are far from thinking that it is impossible to reduce the negative influence of routine by an elementary systematizing of the management process. This must be done and here V. A. Skripov is certainly correct. But if we want to seriously solve the long-range production problems, then we must clearly differentiate operational management and long-range management and not foster the unattainable dream that one fine day routine will suddenly disappear.

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PROPER MANAGEMENT TECHNIQUES TO CONTROL OVERTIME EXAMINED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 174-181

[Article by R. B. Gitel'makher, Candidate of Psychological Sciences, from Ivanovo: "The Lessons of Overtime"]

[Text] The steel casting shop at the tractor plant chronically did not fulfill the plan. In order to rectify the situation, an experienced leader Petr Alekseyevich Shatrov was appointed as its chief. Incidentally, his subordinates called him grandfather for his wisdom, age and completely gray head of hair.

The first month of grandfather's rule was completed. The main reason for the shop's sickness was established and it was extremely low discipline. Explanations, persuasion and appeals did not produce results. And Shatrov then went to work.

...An analysis of the fulfillment of the daily and 10-day quotas showed that the mold making section was to blame for the failure of the shop's plan. Here the workers arrived late, as a rule, 5 or 10 minutes late, and left early justifying all of this by the poor operation of public transport. Shatrov checked and this was a lie! Productivity was low and this was explained by the fact that there was not enough air for the molding machines and the mix preparation department was late in supplying the earth. This was also not confirmed in a check. But wages--they were something else! Where did they come from? The section chief explained:

"Zverev's brigade 'is twiddling its thumbs': it takes its time and waits for overtime and hence we pay them double. They are the boss in mold making."

Called into the shop chief, Zverev entered smiling with his hands in his pockets. There was no serious talk. In saying farewell there was an exchange of "kindnesses":

"Don't count on overtime and you must work the entire month, otherwise you will not receive your former pay!"

"If you get rid of this personnel you will be like a general without an army..."

On the next day the brigade further reduced productivity. The steel casting section, the casting section and the plan of the entire shop looked even sicker. There were calls from the director, the chief of production, the machine shops and assembly.

The director called Shatrov up "on the carpet" but spoke calmly since he knew him well and was certain that such a worker was not stupid. Petr Alekseyevich explained what was happening.

"Well, what should we do not?" asked the director. "Let us assume that we teach Zverev a lesson but then who makes the castings?"

"There is a way out. You must turn over to us eight casting workers from the steel casting and repair casting shops. I have already spoken to the chief of the repair-casting shop. But you speak to the steel casting shop as it is most difficult for them."

The director pushed a button on the intercom:

"Stanislav Gemad'yevich! Help us with men, we need about seven persons."

"For the assembly conveyor again?"

"No, for the mold makers."

Silence and coughing in the receiver.

"Yes, a situation.... I am working shorthanded but I cannot refuse grandfather as he has helped me so many times...alright! As of tomorrow. But they should get their wages."

The end of the month arrived and overtime was inevitable. But all the brigades organized for this work but not Zverev although he was confident that he would be indispensable.

Of course, there was no hope of fulfilling the plan by the shop for the very first month of grandfather's leadership. But the picture had changed and things were not so gloomy. The section chief had somewhat come to life but felt that Zverev was again complicating the situation. In actuality when Zverev had learned that the brigade's wages were one-third less than usual he threw a request for quitting on the desk of the section chief.

What should be done? A leading worker with more than one decoration and a shock worker. You could expect telephone calls! The leaders of the shop decided to prepare for them and drew up a detailed description of all the "artistry" of the brigade leader in the recent past.

On the following day, another seven applications were on the desk of the shop chief and the entire brigade had quit. Grandfather himself had not expected this and here was reason for thought. A major disaster! And there were calls, summonses and discussions engulfed the entire shop. It was essential to decide just what this was: solidarity with the brigade leader, the unity of the workers or blackmail and a threat?

The leaders made a detailed study of the biographies of each brigade leader: one was to retire on pension in a year; the second was at the top of the list for receiving an apartment; the third had a large family and it would be simply impossible to find work in the city with such good pay. They concluded that this was blackmail, directly or indirectly organized by the brigade leader.

They called in the brigade leader. He, as always, behaved challengingly, categorically. At the end of the conversation Zverev held a signed statement [of dismissal]. But what about the workers of the brigade? During the month they took their requests back.

Shatrov had to cut through many such knots at more than one section before the shop began to meet the plan.

Let us analyze the situation. Thus, Shatrov was sent into the breach in order to straighten all aspects of the shop's activities: plan fulfillment, discipline and moral-psychological climate.

Certain leaders, even before taking up the position, would begin with "reforms": they would immediately replace many foremen, they would alter the organizational structure of the shop and the production links and rearrange the equipment. However, this external effect of innovation merely creates additional difficulties and intensifies the chaos. Precisely V. I. Lenin warned about this useless business: "We have terribly many persons who are fond of reorganizing at any occasion and from these reorganizations such disasters result as I have never known in my life."¹

But how did Shatrov start out? The experienced production worker determined that in the shop there was a group of brigade leaders who under various pretexts specially impeded productivity during the month in order to obtain double wages and even more by overtime. The new shop chief assembled the brigade leaders and proposed that they work like they should every day.

As is known, material incentives mean a great deal in increasing production effectiveness and the satisfaction of a worker with his job (in our episode, double wages for overtime). But these alone do not solve the problem of linking the achievements of the scientific and technical revolution with the advantages of the socialist economic system. After a certain level even a contradiction arises: the higher the wages the weaker the role of the material incentive.

The question arises: what are the causes for the existence of the described phenomenon?

"In the old capitalist society," wrote V. I. Lenin, "discipline over the workers was carried out by capital by the constant threat of starvation. And since this threat of starvation was linked to unbearably severe labor and with the

¹ V. I. Lenin, PSS [Complete Collected Works], Vol 44, p 326.

awareness of the workers that they were working not for themselves but rather for the good of someone else, the labor situation was turned into a constant struggle of an enormous majority of the workers against the production leaders. On these grounds inevitably there arose a psychology where the public opinion of the workers not only did not chastise poor work or idling but, on the contrary, saw in this an inevitable and legitimate protest or a method of resisting the excessive demands of the exploiter.... It would be absurd to demand a rapid changeover in this area or to hope that changes in this regard could be achieved by several decrees just as it would be to attempt by appeals to instill optimism and the ability to work in a person who has been beaten down to being half dead."²

Thus, one of the reasons of negative psychology is what we term the vestige of the past. But it would be wrong to reduce things merely to this. As was correctly pointed out at the June (1983) Plenum of the CPSU Central Committee "the reasons for many of these sore spots must be sought in present practices, in the miscalculations of various workers, in the real problems and difficulties of our development and in the shortcomings of indoctrinational activities. For this reason, for eliminating the negative phenomena there must be not only constant propaganda efforts but also measures of an economic, organizational and legal nature."

However, let us continue an analysis of the situation. Thus, Shatrov set tasks for the collective and proposed that the brigade leaders organize their work. They accepted this as they should. Only Zverev felt that the shop chief was merely threatening and with the existing chaos in the shop he would find overtime inescapable. Moreover, the brigade leader was confident that his authority was very high and the encroaching on it would discredit the new shop chief. As events were to show, Zverev was partially right and Shatrov had to justify his actions. However, the situation of the shop chief was not hopeless. The grandfather neutralized the activities of the negative leader and this was the key to solving the problem. Precisely this is how a leader should start in getting into a difficult collective.

I would like to draw attention to one other detail. The chief of the steel casting shop also had difficulties in fulfilling the plan but he went to the grandfather for help. Why? In the first place, Shatrov at one time had also helped him and secondly, among a majority of leaders there is a highly developed feeling of comradeship and mutual aid and this horizontal tie of the leaders is constantly being developed today.

Thus, Shatrov took radical measures to fulfill the plan. He was aided by his rich experience and a knowledge of worker psychology. As a whole, he accurately forecast the actions not only of Zverev but also all the brigade members who had submitted their requests for leaving. The opinion that this was blackmail and the result of agitation by the brigade leader was confirmed. The age of the workers, family status, housing conditions, needs and so forth persuaded him that they did not have grounds for leaving. It was merely a desire to

² V. I. Lenin, PSS, Vol 36, p 145.

intimidate the shop chief ("the plan will not be fulfilled"), to discredit him ("he is persecuting the personnel") and to show a feeling of comradeship, although a false one, for the brigade leader. But all of this was merely "of-the-minute reasons which could not conceal the main ones: satisfaction with the job and the collective, wages, the obtaining of housing soon, authority in the collective which had developed over many years of work, closeness of work to home and so forth. Probably, a portion of the workers who submitted their requests did not do this immediately and later feared that the chief might sign them. They knew that the "grandfather" was not fond of joking.

Shatrov understood all of this and tried as quickly as possible to isolate the negative leader. Such self-centered persons as Zverev would not take the request back although ultimately this would not be good for them. Zverev having turned in his request, could work for another month. Over this time he would maintain a situation for the brigade to leave and the men would be embarrassed to take their request back. Considering all these factors, the shop chief pressured Zverev to leave quickly with the question:

"What date will you be leaving?"

"As of tomorrow," the brigade leader blurted out.

"...Overtime! At times this is essential for carrying out the state plan. It is necessary where it is caused by objective difficulties such as the delayed delivery of materials and preassembled parts, by an acute manpower shortage at newly organized enterprises and so forth.

However, it is a misfortune that overtime having once arisen as a need, for many leaders becomes a constant method for fulfilling the plan (they rely on this and it is used to conceal all shortcomings of an organizational, technical and economic nature) as well as a method for "acquiring" money for individual workers.

One also cannot accept the psychological consequences of overtime. These are:

- 1) The collective, as a rule, has no satisfaction from the work done;
- 2) Equipment is worn out rapidly for, in endeavoring to obtain an increased wage, individual workers endeavor to get all they can out of it and hence the nonobservance of repair schedules and turnover;
- 3) A habit arises of easy earnings and this "sticks" to workers with unstable attitudes who do not have their own opinion, primarily to the youth;
4. A portion of the leaders tolerate unsteady production and consider this a natural situation, where one-half of the product is manufactured in the third 10 days of the month;
- 5) The worker deprived of a day off does not have an opportunity to regain his physical and mental forces and hence there is a decline in productivity in the following week;

6) Systematic overtime creates a mood of passivity in the workers as well as a mistrust in their own and the leaders' abilities to work differently.

One of the main traits in the personality of a Soviet worker is dedication to the nation, production and the collective. He fell from hunger and fatigue during the war, he worked unstintingly to rebuild the plants and factories after the war, and plowed up the virginlands in fierce battle against nature and disorder. And now he is all ready to help production, when things get difficult with the plan and not out of selfishness but out of the urgings of his worker's conscience. In our times of peace, during the period of developed socialism, the same worker does not desire to systematically work overtime if this has been brought about by disorganization and chaos.

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COMPUTER-GENERATED MANAGEMENT PROFILES DESCRIBED IN BOOK

Novosibirsk *EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA* (EKO) in Russian No 3, Mar 83 pp 182-185

[Review by Candidate of Technical Sciences Yu. I. Tychkov from Novosibirsk of the book "Sistema avtomatizirovannoy attestatsii rukovoditeley i spetsialistov (opyt sotsial'noy tekhnologii)" (A System for Automated Certification of Leaders and Specialists [An Experiment in Social Technology]) by V. K. Tarasov, Tallinn, Valgus, 1982, 119 pages: "A Computer Draws a 'Professional Portrait'"]

[Text] The 26th CPSU Congress emphasized that improving the management mechanism requires a profound change in the content, methods and style of activities and a reshaping of the very psychology of management personnel.

Frequently one hears the phrase: "They appointed a comrade to a leading position but he could not handle it...." The question arises of why he could not. It turns out that the appointing to this position was incorrect since the comrade did not possess the necessary knowledge (or, for instance, was not suitable for human qualities). Understandably the error could have been avoided if the applicant for the position had been chosen more carefully and more scientifically. It scarcely needs to be proven what a high price is paid for mistakes in the placing of personnel. This is why effective work with leaders and specialists is of great importance for improving the management level.

The system for the automated certification of leaders and specialists (SAARS) worked out and introduced by V. K. Tarasov and his co-workers can be considered an important step in this direction. The book discussed provides a detailed description and guide for employing the new procedure.

SAARS differs fundamentally from the methods of certifying leaders and specialists which exist in our nation and this difference comes down to the following. Information on the professional qualities of the person being qualified is printed by the computer in the form of a complete document, a certification sheet which along with objective data (position, age, education and so forth) also contains a description of the person being certified in the form of a text which can be uniformly understood by all and consisting of phrases of ordinary conversational language. This text is drawn up on the computer on the basis of the opinions of experts using a special algorithm and consists of 16 phrases.

The experts do not evaluate qualities in numbers of points but merely choose the necessary phrases from a dictionary of professional descriptions where each of the 80 professional qualities is represented in the form of 6 phrases. If an expert feels that none of the 6 phrases is capable of correctly expressing his opinion on the person being certified in terms of the given quality, the expert is free to move on to those qualities where he does find the suitable phrases.

The objectivity of the computer-compiled recommendations can be checked by a special procedure where a portion of the characteristics is chosen and from this the persons being certified are identified. Thus, an opportunity arises from several different algorithms for compiling the description to choose the one which gives the best results in making the identification, that is, there is a strict quantitative criterion (the importance of the identification function) for assessing the degree of accuracy of the method.

The list of 80 qualities contained in the dictionary of professional characteristics is not arbitrary but rather has been dictated by the necessity of carrying out a number of specific management tasks (improving skills, developing managerial functions, personnel placement, choice of a management style, an improved psychological microclimate and so forth). The dictionary does not contain qualities which are not related to a certain specific management task, that is, it lacks a sort of dead weight.

Complete automation has been provided starting with the fact that the computer itself writes out the assignments for the experts and in the event of a punch error in the code of the person being certified, it itself restores the correct code (what could be worse than assigning the characteristics of one worker to another) and ending with the fact that the computer itself, if this is advisable, links two phrases of the characteristics into one.

Along with carrying out the task of certification, a series of other managerial tasks can also be performed (with a varying degree of automation).

In certifying leaders from production collectives, as "objective" information on the results of their activities they use the "Structure of Actual Personnel Problems." Here they consider that the leader should be responsible for the professional qualities of the personnel subordinate to him and for the psychological atmosphere in the collective led by him.

With the aid of special technical devices complete anonymity of the expert evaluations is ensured.

Let us re-emphasize that the main (system-forming) element in the SAARS as a method, is the presence of a computer-compiled written description from which it is possible to identify the worker to whom this description belongs. "We have tried," writes V. K. Tarasov, "to organize the expert's work in a way similar to what he would do if he was handed a thick package of photographs and asked him to select all those cards on which X was depicted and whom the given expert knows perfectly by face."

Not only humans but also equipment, production methods and links between structural levels can act as objects being certified. Let us again quote the author: "The subjective attitude of the experts to what is being certified by us is not only not neutralized but rather is employed by relying on the subjectivity of attitudes shown in the discrepancy of expert opinions over the same person being certified. We can...carry out various sociopsychological tasks (for example, assess a psychological microclimate, discover confrontational groupings in the collective and so forth). If all the experts answered strictly 'objectively', that is, they all said the same thing, it would be impossible to carry out such tasks."

Among the merits of the SAARS one must also put the circumstance that the system provides for one document which can be legally defended, a description representing the computer processes replies of the experts. In this manner the possibility is eliminated of ignoring or playing down the importance of the results of expert evaluation in qualification as can happen when there are two documents: an official description and an "evaluation sheet" (the result of the expert evaluation). All other similar methods known to use provide precisely for the two documents.

It is important to point out that the SAARS makes it possible to determine directions for seeking out reserves and with the use of the software to assess the quality of management and encourage its improvement. Finally, the given method provides an opportunity to obtain a final document "The Structure of Urgent Personnel Problems." However, not all the provisions of the SAARS seem indisputable to us. For instance, the computer generated description still is not a legal document before the signing of the certification sheet (that is, before the end of certification) and this can cause complications in instances when the person being certified does not agree with this description and has grounds to dispute it. This aspect is not clearly taken up in the book.

Moreover, the realization of the SAARS using small third-generation computers impedes its introduction at large industrial enterprises equipped with fourth generation computers. One can only welcome the fact that the SAARS authors are working out a new version of the system which proposes employing the Unified Computer System as the technical base. This will help in more widely utilizing the indisputably interesting and useful method in enterprise management practices.

I feel that the book by V. K. Tarasov, in being written, clearly, logically and in a lively manner, will attract the attention of many economic leaders and specialists. I would like to end the review with an episode described in the book: "It's (SAARS) second version was introduced at the Tallinn Machine Building Plant. It did not cost the plant much since the scientific research which preceded the development of the system had already been paid for. When we presented the computer-compiled descriptions along with a bill, the plant director V. Veskiyali (now the republic minister of local industry) said: 'If I recognize my deputies from your descriptions I will pay for the work and if I cannot I won't pay.' Fortunately, he recognized all of them and we remained in the dark as to what degree his words were only a joke."

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ACTIVITIES OF LENINGRAD EKO CLUB TRACED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in Russian No 3, Mar 83 pp 186-187

[Article by R. F. Zhukov and A. V. Chmel' from Leningrad: "Every Other Monday at 1830 Hours"]

[Text] It seems that quite recently the club of EKO friends had been founded in Leningrad but now more than 20 sessions have been held. The club has several-score permanent members who are representatives from different enterprises, VUZes and scientific research institutes. This is seemingly not many for such a city but all its members--from a machinist to a professor--feel that the club has a diverse and full life. The editors' announcement in one of the issues that they "as a rule, did not participate either in the planning or organizing of such clubs" was accepted calmly but also with criticism.

One should have seen the joy expressed by the club members when "this rule was violated." Thus, there was a warm greeting for the member of the EKO editorial staff Yu. I. Tychkov who visited the May session in 1983. He told the members of our club about the publishing plans for the journal and gave a report "The Leader and ASU [automatic management system]" which briefly set out his concept of information tactics and strategy for a modern leader and answered numerous questions from the club members.

The Leningrad Club of friends of the EKO journal has soberly assessed its humble successes and it was all the more pleasant for us to read in three issues of the journal in 1983 the articles by G. A. Kulagin "The Director's Days" the theses of which had been given by the author to the club members in 1982. In viewing as one of their tasks the discussion of materials for publishing in EKO, all the club members assumed the obligation of forwarding materials to the editors only after their preliminary discussion and approval at a club session.

Gradually the basic areas of the club's activities have been shaped. These are, in the first place, the problems of training, retraining and advanced training for the personnel. For this reason, it is far from accidental that there will be a "roundtable" session and this has been included in the club's 1984 work plan and at which these problems will be thoroughly analyzed. The club members, in discussing the most interesting of all the journal's

publications such as "The Director's Days" by G. A. Kulagin and "Waste-Free... Consumption" by V. F. Komarov, "Murphy's Law" by Artur Blokh and certain others, voiced requests for the editors. For example, everyone wanted to see more articles on the rationalizing of management labor technology and a constant section "Techniques of Personal Work" as well as memoirs of prominent Soviet managers. Unanimously the club members feel that the heading "Economic Life Through the Eyes of Writers" should be published more frequently.

The number of subscribers to EKO in Leningrad has approached 6,000. Any of them would be welcome at the club meetings. The time is the second Monday of the month (with a break of 2 months for summer holidays) at 1830 hours. The place is the Scientists Club at the Polytechnical Institute.

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INCIDENT OF PLANT SUPPORT OF ATHLETES DESCRIBED

Novosibirsk EKONOMIKA I ORGANIZATSIYA PROMYSHLENNOGO PROIZVODSTVA (EKO) in
Russian No 3, Mar 83 pp 188-189

[Article by Lev Layner from Moscow: "What Can One Do, We Are Growing Older..."]

[Text] The plant director called in the senior inspector from the OTK [technical inspection section] Zyablikov. The conversation was finally to be held. Official and unpleasant. But in a warm, friendly situation. For this reason the director started on an oblique tack:

"How are you feeling, Lev Ivanovich?"

"Thanks, I cannot complain."

"Well, yes...but the years do take their toll. You must admit they do. In your work you must have a sharp eye and an instantaneous reponse.... The honor and glory of the plant depends largely on you. But you..."

"I was injured and I was unable to work at full strength," broke in Zyablikov.

"That was last year, last year," the director commented in a friendly manner, drumming his fingers on the table. "For example, I am going to retire in 3 years. Do you think that I will try to hold onto my position? In no instance! Youth must be given their place. What can one do, Lev Ivanovich, we are growing older and older.... Incidentally, how old are you?"

"Thirty-four."

"You see what I am saying: the years take their toll.... You have too many mistakes."

"The person who doesn't do anything, doesn't make mistakes," interjected Zyablikov.

But the director had decided that it was time to move from a friendly tone to an official one.

"Well, Lev Ivanovich, of course there is no question of dismissal. But young people must have their place. We will find a job for you at the plant.... Go

back to your department, and write out to the OTK chief a request for transfer to the position of senior guard. In addition to the salary there will be bonuses. You will be in charge of indoctrinational work. Alright?"

"Alright," replied Zyablikov. "But where is this...well, department of thematic inspection?"

"Technical inspection," the director corrected mildly. "On the second floor. The fourth door on the right from the cashier's office. Can you find the way?"

"I will find it," said Lev Ivanovich confidently.

The goalie of the plant soccer team, Lev Zyablikov, knew perfectly where the cashier's office was.

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